Lake County, Illinois

2013 Lake Barrington Summary Report

Prepared by the

LAKE COUNTY HEALTH DEPARTMENT

Population Health Environmental Services

Blue Green Algae Bloom at Beach, Lake Barrington 2013

Lake Barrington is an 91.07 acre impoundment located in the Village of Barrington. In 1925, a dam was installed to raise water levels. The construction of the condominiums surrounding the lake began in 1973, and currently there are over 1300 units which include the Lake Barrington Shores Golf Club.

The lake is available for use by residents for fishing, swimming, and aesthetics. There is a boat launch, marina and swim beach located within the development. Gas powered motors are not allowed on the lake.

In 2013, Lake Barrington was monitored for water quality by the LCHD-ES. Parameters measured included water clarity, temperature, pH, dissolved oxygen, and conductivity. A multi-parameter sonde was utilized to collect data for these parameters. Additionally water samples were collected using a Van Dorn sampler and tested for alkalinity, phosphorus, nitrogen, solids, and chloride. Assessments were made of aquatic vegetation, shoreline erosion, land use and the watershed.

The overall water quality in Lake Barrington is poor. Like many of the lakes in Lake County, it is impaired for phosphorus, based upon the Illinois Environmental Protection Agency's (IEPA) total phosphorus standard of ≥ 0.05 mg/L for lakes with

Environmental Services Water Quality Specialists

Kathy Paap — kpaap@lakecountyil.gov

Kelly Deem — kdeem@lakecountyil.gov

Gerard Urbanozo — gubanozo@lakecountyil.gov

Special points of interest:

- *Phosphorus Impairment*
- *Shoreline Erosion*
- *Beach Swim Bans*
- *Algal Blooms*

Inside this issue:

SUMMARY (CONTINUED)

Lake Facts:

Major Watershed: Fox River

Sub-Watershed: Tower Lake Drain

Location: T43N, R9E, Section 11

Surface Area: 91.07 acres

Shoreline Length: 3.18 miles

Maximum Depth: 13.00 ft.

Average Depth: 7.80 ft.

Lake Volume: 701.35 acre-ft.

Watershed Area: 290.87 acres

Lake Type: Impoundment

Management Entities: Lake Barrington Homeowners Association - Pond and Lakes Commission

Aron and Associates

Current Uses: fishing, swimming, non-motorized boating, aesthetics, golf course irrigation

Access: Private

a surface area greater than 20 acres. One exceedance of 0.05 mg/L TP during the monitoring season is considered impaired. The total phosphorus concentrations in Lake Barrington ranged from 0.015 mg/L - 0.150 mg/L. The 2013 average TP concentration was 0.060 mg/L, an improvement over the 2007 TP concentration of 0.105 mg/L.

Phosphorus and nitrogen are normally limiting nutrients in our region. The ratio of total nitrogen to total phosphorus (TN:TP) in 2013 was 22:1. This TN:TP ratio indicates that phosphorus is the overall limiting nutrient, however monthly TN:TP indicated that by September both nutrients were plentiful enough to cause algal blooms or excessive plant growth.

Total Kjeldahl nitrogen, (TKN) ranged from 0.73 mg/L in May to 1.81 mg/L in September. TKN is the organic form of nitrogen and is usually tied up in plant and algal cells and therefore biologically unavailable. The biologically available forms of nitrogen (nitrate, nitrite and ammonium) in the water were non-detectable early in the spring, however, in September, ammonium (NH4) was detected at a concentration of 0.318 mg/L. NH4 is usually immediately utilized by organisms when there is dissolved oxygen present in the water, the presence of NH4 in September indicates there was sufficient nitrogen available in the lake to support nuisance algal blooms.

Carlson's Trophic State Index (TSIp) uses average TP to estimate the trophic state of a lake. The TSIp for Lake Barrington was 54.6 and therefore is considered an eutrophic or nutrient rich lake. Based upon TSIp, Lake Barrington ranked 67th of 175 lakes in the county measured between 2000 - 2013.

There are many sources of phosphorus that can impact water quality in a lake. Internal cycling of phosphorus occurs when dissolved oxygen (DO) concentrations become low, ≤2.0 mg/L near the bottom of a lake, allowing for the release of phosphorus from anoxic (DO ≤ 1 mg/L) bottom sediments. Eroding shorelines can additionally introduce phosphorus rich sediments into the water column, as well as can foraging and mating carp. Activities taking place in the watershed such as turf fertilization and abundant goose populations can also affect TP concentrations. Reminding the golf course and ground maintenance staff of Lake Barrington Shores to use phosphorus free fertilizers, manage nuisance goose populations and remediate eroding shorelines may all go a long way in reducing phosphorus inputs into the lake.

Algal blooms were prevalent in the lake, especially during late summer. In August, the Lake Barrington Homeowners Association decided to close the lake and swim beach due to the presence of a potentially harmful algal bloom (HAB) which colonized the entire lake. Closures usually occur to swim beaches due to the detection of elevated E-coli (235 colonies/100 mL) in a water sample collected at the beach. No swim ban was issued for Lake Barrington Shore Beach in 2013 due to E-coli contamination. Since the LCHD-ES last sampled in 2007, the beach only had three swim bans, two in 2008 and one in 2010.

Algae is driven by nutrients, especially phosphorus, but nitrogen concentrations of 0.3 mg/L have been known to support late summer algal blooms. Additionally blue-green algae or cyanobacteria are able to fix nitrogen from the atmosphere. If there is low abundance of vegetation to compete with algae for these two limiting resources, algae gains the competitive edge and this leads to algal blooms. According to the consultant for the Homeowners Association, the blooms of blue green algae in Lake Barrington in 2013, were the worst observed in the 20 years that she had managed the lake.

Since 2007, average chloride concentrations in Lake Barrington decreased 9.9%. The average concentration in 2013 was 113 mg/L. This remains below the critical concentration defined by

SUMMARY (CONTINUED)

the U.S. Environmental Protection Agency (230 mg/L) for general use. Flora and fauna within the lake as well as the entire lake ecosystem can be impacted if chloride concentrations remain at the critical level 230 mg/L for extended periods of time.

Many lakes in the county have exhibited increasing chloride concentrations over the years and some have exceeded the standard. The main contributing factor has been linked to deicing products, in particular the use of rock salt. Water softener system discharges have also been identified as another source of chlorides into waters. It does not take much to increase chloride levels, only 1 teaspoon of salt is capable of polluting 5 gallons of water.

An assessment of the aquatic vegetation in Lake Barrington was conducted in July, 2013. Ninety-eight points were assessed and 48% of the points sampled were colonized by aquatic vegetation. The estimated plant density in found in the lake was 17.4%. Twelve species were detected in the survey. Non-native invasive species such as Eurasian Water Milfoil and Curlyleaf Pondweed were not found in the lake during the survey. The Floristic Quality Index (FQI) was 21.2.

The shoreline of the lake was assessed for erosion in October, 2013. Erosion along the shorelines of Lake Barrington increased since it was last assessed in 2007. Thirty-one percent of the shoreline exhibited some degree of erosion. Nineteen percent of erosion detected was either moderate (15%) or severe (4%). An additional 12% was assessed as having slight erosion.

WATER CLARITY

Water clarity is measured by Secchi disk. At each visit, the Secchi disk is lowered into the water column at the deepest part of the lake, until it is no longer visible, this depth is recorded.

In 2013, the average Secchi depth in Lake Barrington was 6.1 feet. It was likely higher however, the June Secchi depth data was missing. The 2013 average Secchi depth was above the county median and similar to the average Secchi recorded in 2007 (6.0 ft). Lake Barrington ranked 43rd out of 158 lakes in Lake County based upon average Secchi depths collected since 2000.

Since 2001, the average Secchi depth has increased on Lake Barrington each year it was monitored. In 2013, like past monitoring years, the water clarity declined in July and continued to decline until it leveled off for the remainder of the monitoring season at 3.43 and 3.45 feet in August and September, respectively (Figure 1).

Algae was observed on Lake Barrington throughout the entire monitoring season. In July, filamentous algal blooms were noted as colonizing floating vegetation and by August blue green algae was observed throughout the lake.

Encouraging the spread of the aquatic vegetation in Lake Barrington would help to improve the water clarity by providing competitive pressure to algae for nutrients and light. Plants also secure bottom sediments and minimize redistribution into the water column. This becomes important especially in shallow lakes such as Lake Barrington where water clarity may be compromised by wind and wave action.

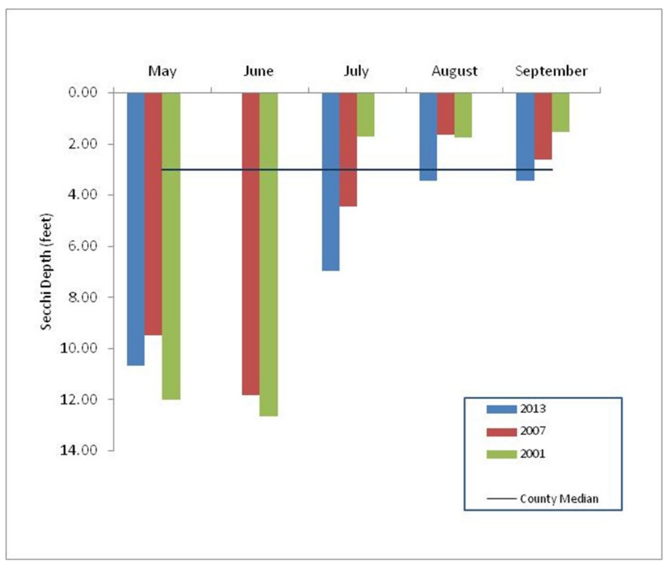


Figure 1. Water Clarity in Lake Barrington 2001, 2007, and 2013. (Measurements taken May - September)

TOTAL SUSPENDED SOLIDS

Total Suspended Solids (TSS) are made up of both volatile solids (TVS), which are organic sources such as plankton, and inorganic non-volatile suspended solids (NVSS) or sediments. Both types of solids adversely affect water clarity.

During 2013 the average TSS concentration in Lake Barrington was 4.4 mg/L. This was a decrease of 35% from the 2007 average TSS concentration of 6.4 mg/L, and much lower than the county median of 8.0 mg/L for lakes measured between 2000 and 2013.

Figure 2 shows the concentrations of TVS and NVSS found in Lake Barrington. TVS concentrations ranged from 99 mg/L to a high of 137 mg/L and were significantly higher than NVSS concentrations (Figure 2). This is reflective of the persistent algal blooms that were observed on and in the lake throughout the monitoring period (May - September). In 2013, the average epilimnetic TVS concentration of 115 mg/L, was only slightly lower than the county median for lakes sampled since 2000 (119 mg/L).

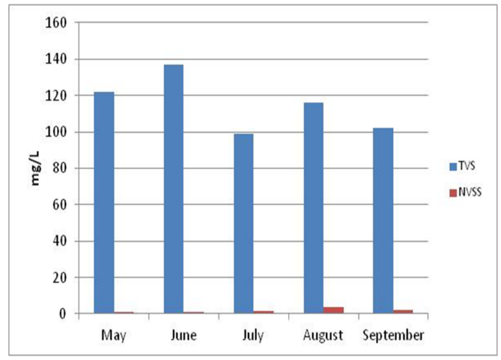


Figure 2. TVS and NVSS concentrations in Lake Barrington, 2013.

NUTRIENTS

Phosphorus and nitrogen are normally limiting nutrients in natural systems. However anthropogenic inputs of nutrients into the environment this has significantly changed this pattern. For instance phosphorus has increased in many of our landscapes and because of this many of our lakes are experiencing excess phosphorus concentrations, this is true as well for Lake Barrington which is considered impaired for total phosphorus (TP). This is due to TP concentrations exceeding the IEPA standard of ≥0.05 mg/L on at least one occasion during the monitoring year (Figure 3). In 2013, the average TP concentration on Lake Barrington was 0.60 mg/L. This is slightly below the median TP concentration of 0.067 mg/L from lakes monitored since 2000, and less than the average TP concentration recorded in 2007 of 0.105 mg/L.

TN:TP ratios determine which of the two nutrients, nitrogen or phosphorus, will limit plant growth in a lake. Ratios over 20 indicate a system limited by phosphorus, under 10 the system becomes limited by nitrogen. Ratios

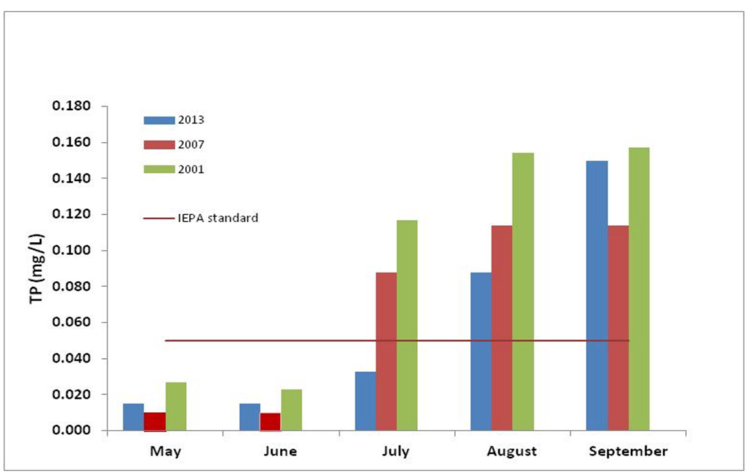


Figure 3. TP concentrations in Lake Barrington 2001, 2007 and 2013.

NUTRIENTS (CONTINUED)

falling between 10 and 20 indicate that the system has plenty of both nutrients to support nuisance plant and algae growth. Lake Barrington is considered phosphorus limited system with a TN:TP ratio of 22:1, therefore, any additional phosphorus introduced into the lake will promote excessive algae or plant populations. Monthly TN:TP ratios indicate that Lake Barrington was phosphorus limited until August and September when TN:TP ratios were 18:1 and 12:1, respectively. At this time, neither of the nutrients were limiting. A blue green algae dominated the lake during this period, severely decreasing water quality on the lake. Blue green algae, have the ability to fix nitrogen and therefore in lakes with available nitrogen, they have the competitive edge. In September, ammonium was available throughout the entire water column.

Lake Barrington is considered a eutrophic lake based upon its Trophic State Index (TSIp) score of 54.6. The TSIp is based upon the total average phosphorus concentration. The higher the score the more nutrient enriched the lake (Figure 4).

Phosphorus (P) can be introduced into a system either from the external sources (i.e. watershed) or internally from bottom sediments. Anoxic sediments release phosphorus into the water column and can occur when waters above the sediment are still considered oxic with DO concentrations near 2 mg/L.

Lake Barrington exhibits polymictic tendencies, mixing from time to time during the summer, instead of only in spring or fall. Therefore the lowest hypoxia (low oxygen conditions) may not be exhibited in the water column, meanwhile anoxic (in the absence of oxygen) sediments continue to release P into the system.

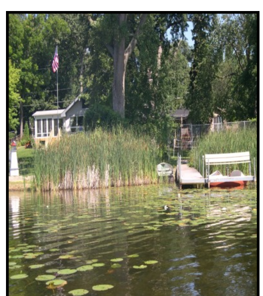
LCHD-ES recommends that the Lake Barrington Shores Homeowners Association and Golf Club manage the development utilizing best practices for reducing phosphorus inputs, such as minimizing goose populations, using phosphorus free fertilizers, and keeping yard waste out of the lake, just to name a few.

Additionally, the Association should consider installing an aeration system to prevent stratification from occurring in the lake. In 2013, Lake Barrington weakly stratified in July, an event(s) came along and began to mix the lake in August, and by September it was completely mixed. Preventing stratification from occurring in the lake, can promote oxygenated bottom sediments and subsequently prevent the release of phosphorus, further reducing the occurrence of algal blooms that have continually caused management problems in Lake Barrington.

Figure 4. Trophic State of Lakes.

OLIGOTROPHIC:

Lakes are generally clear, deep and free of weeds or large algae blooms. Though beautiful, they are low in nutrients and do not



MESOTROPHIC:

Lakes lie between the oligotrophic and eutrophic stages. Devoid of oxygen in late summer, their hypolimnion limit cold

EUTROPHIC: Lakes are high in nutrients, they are usually either weedy or subject to frequent algae blooms, or both. Eutrophic lakes often support large fish populations,

WATERSHED

The watershed of Lake Barrington is estimated to be 290.87 acres and is encompassed mainly by the Lake Barrington Shores Development (Figure 5.). Land use in the watershed is comprised of 7 categories, Government and Institutional, Multi-family, Public and Private Open Space, Single Family, Transportation, Water and Wetlands. The three dominant land uses were Multi-family (34.4%), Public and Private Open Space (24.7%) and Water (32.2%). The percent total estimated runoff is dominated by Multi-family (63.3%), Transportation (19.0%) and Public and Private Open Space (13.6%). Lake Barrington is protected from a much larger pollutant contamination due to ratio of its watershed to lake being small (3:1), however, once pollutants enter the lake they are retained there for up to 3.46 years. Therefore it becomes important to properly manage the lands in a way that minimizes pollutants such as phosphorus and chlorides from entering the lake.

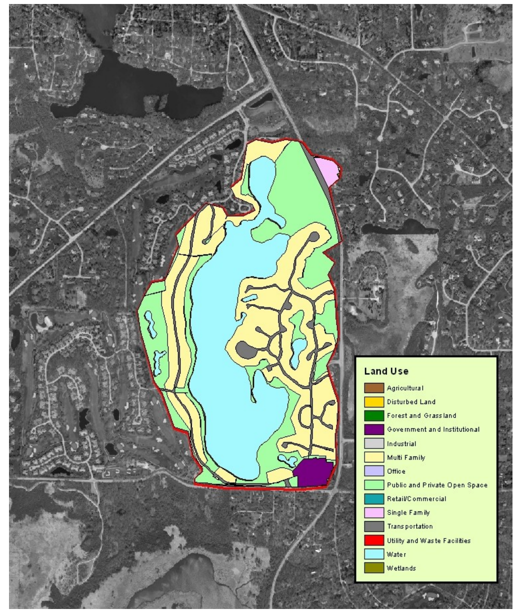


Figure 5. Land Use within Lake Barrington watershed, (data collected from 2010 imagery).

DISSOLVED OXYGEN (DO)

Dissolved Oxygen (DO) is essential for the survival of fish and invertebrates in a lake and influences many different biological and chemical processes in lakes.

Supersaturated % DO can cause problems as can low DO concentrations. Supersaturation of % DO happens when % DO becomes greater than 100%. DO saturation greater than 110% can begin to impact certain fish species. In rare cases, excessive % DO is known to lead to gas bubble disease, where oxygen bubbles or emboli block the blood flow through blood vessels. Lake Barrington was considered supersaturated from May through August. Notably in July % DO readings were between 121% and 126% within 1-5 feet of the water surface, and in August % DO ranged from 127% to 142% within the first four feet of the surface. This was likely due to the presence of photosynthesizing algae in the water.

DO concentrations that are ≤2 mg/L near the lake bottom can cause hypoxia in the bottom sediments and phosphorus release into the lake occurs. Since Lake Barrington is a phosphorus limited lake, any additional phosphorus will feed plant and algal growth, and should be avoided.

In 2013, a blue green algae bloom was persistent throughout late summer and likely contributed to the low DO concentrations experienced in September.

As previously mentioned the Lake Barrington Shores Homeowner Association should consider the installation of an aeration system strong enough to prevent stratification of the lake. It is estimated that an aeration system between 81cubic feet per meter (CFM) and 117 CFM would be required needed to supply enough airflow to destratify Lake Barrington. Depending on what type of aeration system is utilized, high or low pressure, this can require a horsepower ranging from 7.9 hp to 18.8 hp.

CHLORIDES/CONDUCTIVITY

Conductivity measures the amount of ions contained in a waterbody. The more ions or salts that a water body contains the higher it's conductivity. Conductivity can be used to estimate both total dissolved solids (TDS) and chloride concentrations due to a strong correlation between these parameters. It has been decided in more recent years to analyze chloride concentrations in lakes due to a strong relationship discovered between road salt usage (which contains 40% chloride) and increasing chloride concentrations in lakes. Even more recently, water softeners have additionally been found to play an important role in increasing chlorides in waters. It only takes 1 teaspoon of salt (chloride) to pollute 5 gallons of water (230 mg/L). Once chlorides are in the water they remain there indefinitely, unless the water is diluted or treated by a reverse osmosis system, which is a very costly alternative.

It only takes1 teaspoon of salt to pollute 5 gallons of water.

In 2013, the average chloride concentration in Lake Barrington was 113 mg/L, this is a decrease of 9.9% from 2007 when the average chloride concentration was 128 mg/L. Chlorides ranged from 106 mg/L in July to a high of 122 mg/L in May, and were likely higher early in spring after snowmelt. Chloride concentrations measured in Lake Barrington were below the critical concentration of 230 mg/L (USEPA). Adverse impacts to the lake ecosystem and it's inhabitants are known to occur if the critical concentration is maintained for prolonged periods. However, certain species can be affected at concentrations lower than the critical concentration. Although chloride concentrations were not highly elevated in 2013, multi-family and transportation were estimated to be the two highest contributors of total percent runoff, and therefore as homeowners and maintenance personnel, consideration should be given to salt usage. Additionally, the golf club utilizes the lake water for irrigation. There have been cases where golf courses have had to install deep groundwater wells due to chloride concentrations in the supplying waters prohibiting the use due to it killing the receiving turf grasses.

The LCHD-ES and Lake County Stormwater Management Commission (LCSMC) have been holding annual training sessions targeting deicing maintenance personnel for both public and private entities. This is an attempt to educate winter road maintenance crews on the recommended application rates for applying deicers and hopefully reduce the amount of chloride being introduced into our environment while maintaining safe passageways. Almost all deicing products contain chloride so it is important to read and follow product labels for proper application. For instance, at 10° Fahrenheit, rock salt is not at all effective in melting ice and will blow away before it melts anything. Additionally calling your local township office to ask them if they are taking any actions to minimize deicers on their properties or supporting changes in their deicing policy to minimize salt usage is encouraged.

What can I do to help?

- Shovel (or use a snow blower) before you use any product; never put a deicing product on top of snow.
- Read the product label, before applying product.
- Sweep up un-dissolved product after a storm is over for reuse.
- Consider switching to a non-chloride deicer.
- Support changes in chloride application in your municipality.
- Inform a neighbor about the impacts chlorides have on our lakes rivers and streams.

Modified from (DuPage River Salt Creek Workgroup , 2008)

BEACHES

Lake Barrington Shore Beach is monitored bi-weekly unless elevated E-coli levels (235 colonies/100mL) are detected. If elevated E-coli is found at the beach a swim ban is issued until E-coli counts go below the standard. Since 2007, the beach has had three swim bans, two occurred in 2008 and one in 2010. In 2013, a blue green algal bloom which colonized the entire lake preempted the Lake Barrington Shore Homeowners Association to close the beach and the lake from August into September, (see Algae section below).

ALGAE

In 2013, a blue green algae was prevalent in the lake from August throughout October. Blue green algae are actually cyanobacteria, and are considered algae due to their ability to photosynthesize, they also have the ability to fix nitrogen from the atmosphere, giving them an advantage for expanding their populations into the lake. They are known to release toxins that have adverse effects upon public health and hence are termed HAB's (harmful algal blooms), however, their presence does not mean that toxins are present. It is still unclear what triggers HAB to produce the toxins and the experts are working on understanding the mechanism behind toxin release. Due to the potential for the presence of toxins, the IEPA and the LCHD have initiated a program to collect HABs from beaches and test for presence of microcystin, a common toxin produced by HABs.

In September 2013, the LCHD-ES collected samples mainly from the beach and marina areas of Lake Barrington and performed an Abraxis test to detect the presence of microcystin on the samples. If Abraxis tested positive for microcystin, it was sent to an independent laboratory for enzyme-linked immunosorbent assay (ELISA) testing to confirm the concentration of bacteria in the sample. The results of the Elisa test for the Lake Barrington water samples (Table 1) were well above the recommended level by the World Health Organization for no contact (≥20 ug/L).

Due to the positive results from the Abraxis testing, the Association decided to close the beach and the lake until conditions improved, which extended beyond out monitoring period in 2013. A fact sheet published by the IEPA was distributed to the Association and they posted it in general areas of Lake Barrington shores to educate residents about HABs.

Since it remains unclear what causes HABs to release toxin, LCHD-ES is recommending that HABs not be chemically treated, but left to complete their cycle.

Sample Date	Location	Abraxis	Elisa (ug/L)
3-Sep	Beach	>10	581.30
3-Sep	Marina	>10	635.22
6-Sep	Beach	>10	266.07
6-Sep	Marina	>10	209.31
12-Sep	Marina	>10	52.45
12-Sep	Beach	>10	134.48
17-Sep	Beach	2.5	9.00
17-Sep	Deep Hole	>10	259.19

Table 1. Results from HAB samples in Lake Barrington, 2013.

Other algae were noted to be in bloom on the lake throughout the entire summer. It appears looking at records dating back to 2007 that the lake frequently experiences algal blooms. These blooms have been treated throughout the years, and still persist.

Phosphorus and nitrogen fuel algal growth. HAB's additionally can fix atmospheric nitrogen as well as utilize other forms. It becomes important to

ALGAE (CONTINUED)

maintain or control nutrient imputs for this reason. The LCHD would like the Association to consider alternative strategies such as the use of aerators to remove stratification of the lake and prevent the bottom sediments from becoming anoxic and releasing P. Additionally, a action plan should be developed determining what protocols will be followed in the event of another blue-green algae bloom, as it is highly probable that Lake Barrington will experience future blooms.

AQUATIC PLANTS

Aquatic plants are a critical feature in lakes as they compete against algae for nutrients, improve water quality and provide fish habitat for nesting and nursery. An aquatic vegetation survey was conducted in July, 2013. A 60-meter grid was randomly overlaid on an aerial photo of Lake Barrington and a total of 98 points were assessed.

Forty-eight percent of the points sampled in Lake Barrington were vegetated. Analysis of the vegetation estimated the plant density in the lake to be 17.4%. There were eleven native plant species and Chara (a macroalgae) detected in the 2013 quantitative survey (Table 2). Coontail and Chara were co-dominant species in the lake. There were no invasive plant species detected during our survey. LCHD-ES recommends allowing expansion of native plant populations to attain higher levels of cover. Plants can potentially reduce the abundance of mid summer algal blooms by competing with them for nutrients.

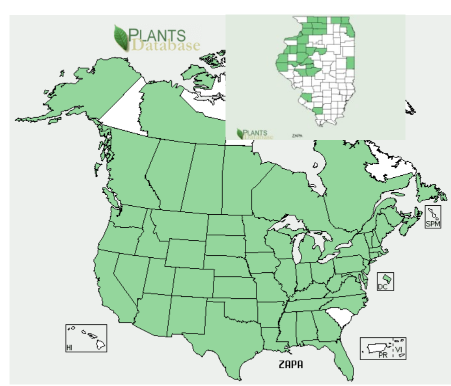
The diversity of plants increased since 2007 from nine species. Slender Naiad, White Water Crowfoot and Curlyleaf Pondweed were not detected in 2013. Horned Pondweed was introduced into Lake Barrington in the late 90's, it was detected in 2013, but not in 2007. Due to the increase in species and decrease in non-native species presence, the Floristic Quality Index increased in 2013, to 21.2 from

Table 2. Aquatic Species detected in Lake Barrington during 2013 quantitative survey.

Common Name	Scientific Name
Chara	Chara spp.
Coontail	*Ceratophyllum demersum*
Duckweed	*Lemna minor*
Elodea	*Elodea canadensis*
Flat-stemmed Pondweed	*Potomogeton zostiformis*
Horned Pondweed	*Zannichellia palustris*
Sago Pondweed	*Stuckenia pectinata*
Small Pondweed	*Potomogeton pusillus*
Southern Naiad	*Najas guadelupensis*
Star Duckweed	*Lemna trisulca*
White Water Lily	*Nymphae tuberosa*

HORNED PONDWEED

Horned Pondweed (*Zannichellia palustris),* a widespread native submerged aquatic plant species was named for the Venetian botanist, G.G. Zannichelli, of marshes (palustris). The axillary flattish and toothed fruits are the distinguishing feature of this species.



AQUATIC PLANTS (CONTINUED)

16.7 in 2007. Floristic Quality Assessments are used for natural areas and allow for comparison among sites. An FQI of 35 is considered of marginal quality. Most lands in the Chicago region score an FQI of 20 or lower and essentially have no significance from a natural perspective (Swink and Wilhelm,1994). Lake Barrington ranked 28th out of 162 lakes assessed for floristic quality.

AQUATIC PLANT MANAGEMENT - PESTICIDES

Aron and Associates is charged with plant and algae management within Lake Barrington. Aron and Associates, along with SeaPro Corp (manufacturer) and the applicator, Marine Biochemist developed the Sonar project. The goal of the Sonar project is to decrease the abundance of Curlyleaf Pondweed in Lake Barrington so as to reduce nuisance populations and minimize the amount of plant management required later in the season. This program was applied up until 2009. Additionally in 2009 a harvester was out on Lake Barrington for 2 days and removed seven truck loads of harvested plants (Curlyleaf Pondweed) and a severe spring algal bloom was treated. As of 2010 a NPDES permit is needed to apply pesticides in aquatic systems (Figure 6). It is assumed that Aron and Associates, or it's applicator secures this permit. For more information on the permit please see the link provided. In 2010 and 2011, endothall (Aquathol K) was chosen to control Curlyleaf populations. In 2012 Sonar (fluridone) was applied once again to control both Eurasian Water Milfoil and Curlyleaf Pondweed. Due to the unusually warm spring and low lake levels in 2012, treatments for filamentous algae increased from prior years, although algae was treated in all years, 2008 - 2013. As in 2012, filamentous algae also required more treatments in 2013 than in recent years, and a more aggressive protocol is being recommended by Aron and Associates focused on Eurasian Water Milfoil in future years. For more detailed information see Aron and Associates reports (2008 - 2013).

In July, 2013, LCHD-ES monitored the lake for vegetation and did not encounter either Curlyleaf Pondweed or Eurasian Water Milfoil. It was impressive to see the growth of these two invasive species suppressed while increasing plant diversity in Lake Barrington, this was reflected in the increase in FQI score in2013.

Figure 6. Herbicide and Algicide applications need to have a Notice of Intent filed with the IEPA.

FOR FULL DETAILS OF THE PESTICIDE RULE SEE:

HTTP://WWW.EPA.STATE.IL.US/WATER/PERMITS/PESTICIDE/INDEX.HTML

SHORELINE EROSION

Shoreline erosion contributes to poor water quality by increasing both the total suspended solids and phosphorus concentrations in a lake with either one of two outcomes, a very weedy lake due to an increase in a normally limiting nutrient (phosphorus) or a lake with few weeds due to decreased water clarity from excessive amounts of sediment or algae being in the water column. In a system without plants, algae can become a problem due to the lack of competition for nutrients by plants. Sedimentation can cause destruction of habitat for fish and other macroinvertebrates due to the deposition of sediment on nests and plants.

In 2013, 31% percent of the 3.18 mile shoreline was experiencing some degree of erosion (Figure 7). The amount of eroding shorelines has increased since 2007 when only 22% of the shoreline exhibited some degree of erosion. Twenty-seven percent of the erosion present on Lake Barrington in 2013 was either slight (12%) or moderate (15%) (Table 3). Undercutting of previous control efforts using rip rap and unattended eroding shorelines made up a majority of the erosion problems. Water level fluctuation on Lake Barrington over the course of the summer was approximately 0.9 ft. Fluctuations of nearly a foot can contribute to eroding shorelines.

LCHD-ES recommends that minimizing shoreline slopes when possible, and using a mix of hardscaping (i.e. rip rap) and plantings of shorelines with native plants (Figure 8). Native plants have deep root systems that are able to more efficiently secure soils than the short root system present in turf grass.

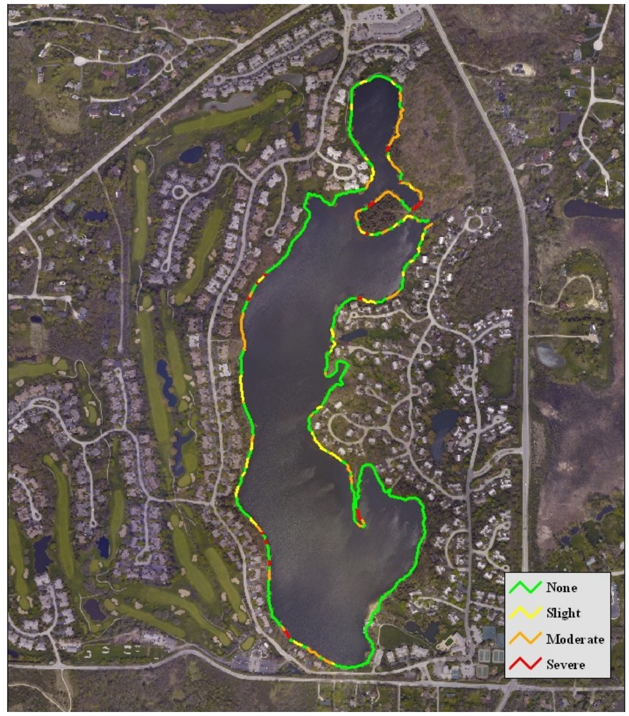


Figure 7. Shoreline erosion assessed on Lake Barrington, 2013.

Figure 8. Example of using hardscaping and native plantings to secure shoreline.

Table 3. Degree of Erosion on Lake Barrington, 2013

Erosion	Miles	Percent
None	2.16	69
Slight	0.39	12
Moderate	0.49	15
Severe	0.14	4

FISH

A survey of the fish population was last conducted by the IDNR in 2003. At that time, eight different fish species (Table 4) were detected during a day of electro-fishing and trap nets. Since the Lake Barrington Shores Homeowners Association and it's Lake and Ponds Commission manage the lake as a sport fishery, it is recommended that an updated survey by the IDNR be conducted. The report generated from the IDNR would provide not only status of the fish population, but also give recommendations to help maintain a healthy fishery.

Table 4. Fish species detected in Lake Barrington, 2003 (IDNR).
Black crappie
Bluegill
Golden shiner
Large mouth bass
Pumpkinseed
Sunfish
Warmouth
Yellow Perch

BATHYMETRIC MAP

LCHD-ES recommends that an updated bathymetric map be secured every ten to fifteen years (Figure 9). Bathymetric maps are helpful resources for lake managers. In 2008, Marine Biochemists made a contour map of Lake Barrington, however, morphometric data did not accompany the map. Morphometric data provides volumetric and other useful data to assist in everyday lake management decisions. If this data did not accompany the map made by Marine Biochemist, then an updated bathymetric map with morphometric data should be completed for Lake Barrington.

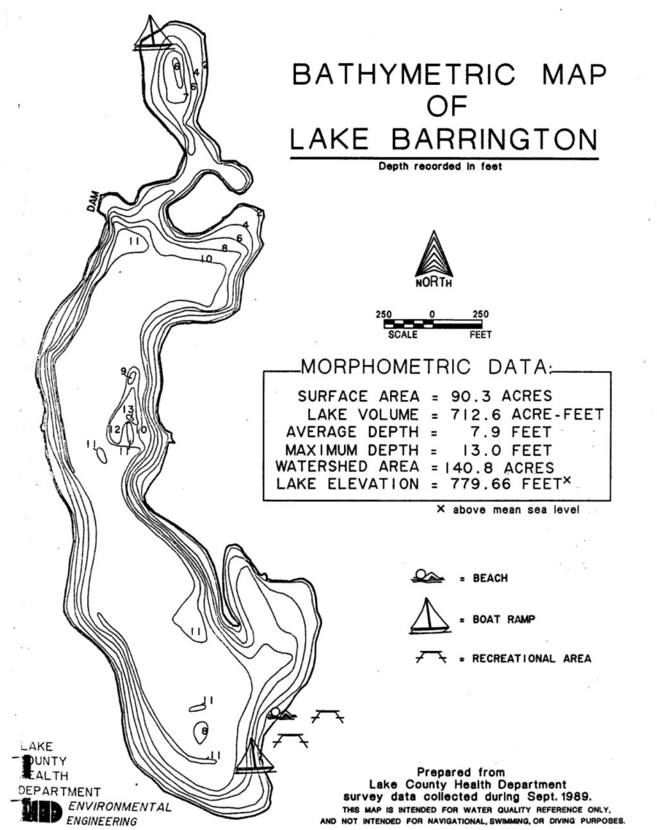


Figure 9. Bathymetric map and morphometric data (LCHD, 1989).

VLMP

Lake Barrington has had a wonderful volunteer resource for the past 23 years. The LCHD-ES encourages the VLMP participants on Lake Barrington to consider participating in the VLMP program at a higher level, Tier 2 or Tier 3. Discussions at a meeting at the end of the season indicated that the volunteers were having problems with mailing samples in the past, however, this was prior to LCHD-ES heading the program in Lake County. Figure 10 below summarizes all Secchi data collected over the years on Lake Barrington. The average Secchi depth from VLMP data was 5.21 feet, this is slightly below the median Secchi depth from lakes in the county whose Secchi depth has been collected since 2000 at 6.00 feet. LCHD-ES was actively monitoring the lake in 2013, the average Secchi depth calculated from their monitoring was 6.12 feet. If interested in participating at a higher level in the VLMP program, please contact Lake County Health Department, Michael Adam, (847) 360-8002

LAKE MONITORING
VOLUNTEER PROGRAM
ILLINOIS

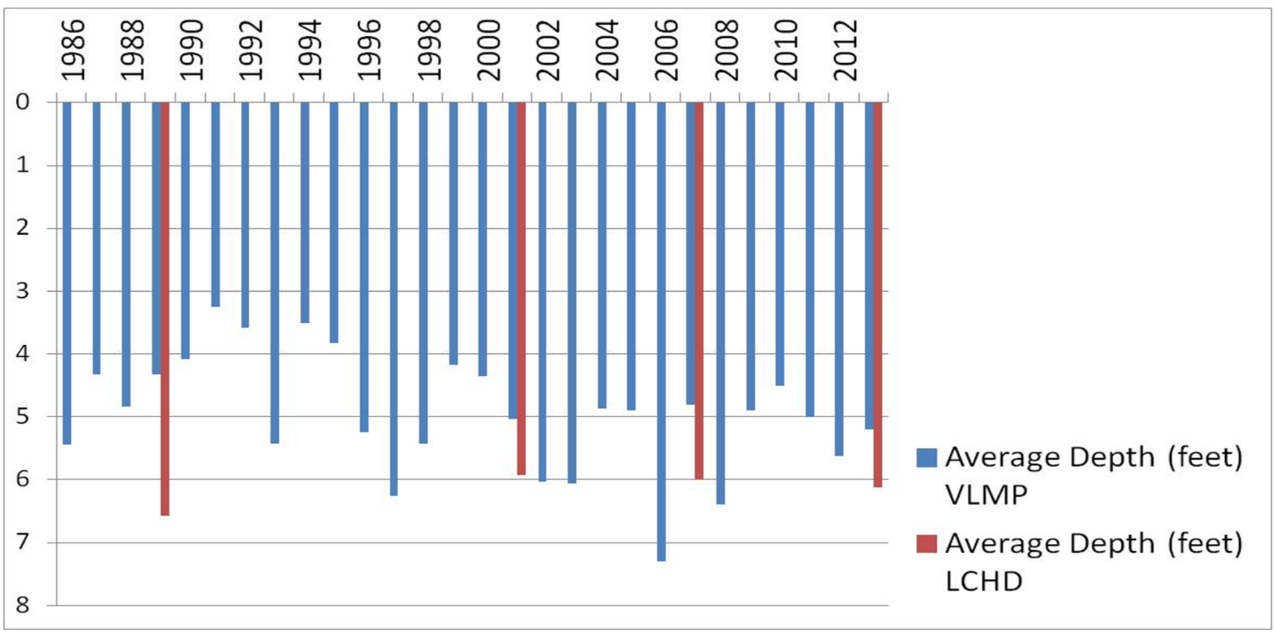


Figure 10. Historic VLMP average Secchi data from Lake Barrington, 1986 - 2013.

Environmental Services

Senior Biologist: Mike Adam

madam@lakecountyil.gov

Population Health Services
500 W. Winchester Road
Libertyville, Illinois 60048-1331

Phone: 847-377-8030
Fax: 847-984-5622

For more information visit us at:

http://www.lakecountyil.gov/Health/want/BeachLakeInfo.htm

Protecting the quality of our lakes is an increasing concern of Lake County residents. Each lake is a valuable resource that must be properly managed if it is to be enjoyed by future generations. To assist with this endeavor, Population Health Environmental Services provides technical expertise essential to the management and protection of Lake County surface waters.

Environmental Service's goal is to monitor the quality of the county's surface water in order to:

- Maintain or improve water quality and alleviate nuisance conditions
- Promote healthy and safe lake conditions
- Protect and improve ecological diversity

Services provided are either of a technical or educational nature and are provided by a professional staff of scientists to government agencies (county, township and municipal), lake property owners' associations and private individuals on all bodies of water within Lake County.

Recommendations

LCHD-ES recommends the following actions for improving the water quality and overall health of Lake Barrington:

- Use best management practices to reduce phosphorus and nitrogen from being introduced into the lake. Practices such as phosphorus free fertilizers, goose population management, and native buffers are among the practices recommended.
- Consider aeration system to prevent lake stratification. This may alleviate late season algal blooms by keeping the DO concentrations in the bottom sediments oxic. The aeration system needs to be large enough to keep the lake mixed, it may be that more than one head will be required.
- Promote the spread of native vegetation in the lake to compete against algae for nutrients and to provide fish habitat.
- Repair eroding shorelines. This can be accomplished through a mix of hardscaping and native plantings. Proper rock size and installation is necessary to ensure long term success.
- The VLMP on Lake Barrington should consider increasing the level of participation in the program to a higher tier.

STOP AQUATIC HITCHHIKERS!™

Prevent the transport of nuisance species.
Clean all recreational equipment.
www.ProtectYourWaters.net

When you leave a body of water:

- Remove any visible mud, plants, fish or animals before transporting equipment.
- Eliminate water from equipment before transporting.
- Clean and dry anything that comes into contact with water (boats, trailers, equipment, clothing, dogs, etc.).
- Never release plants, fish or animals into a body of water unless they came out of that body of water.

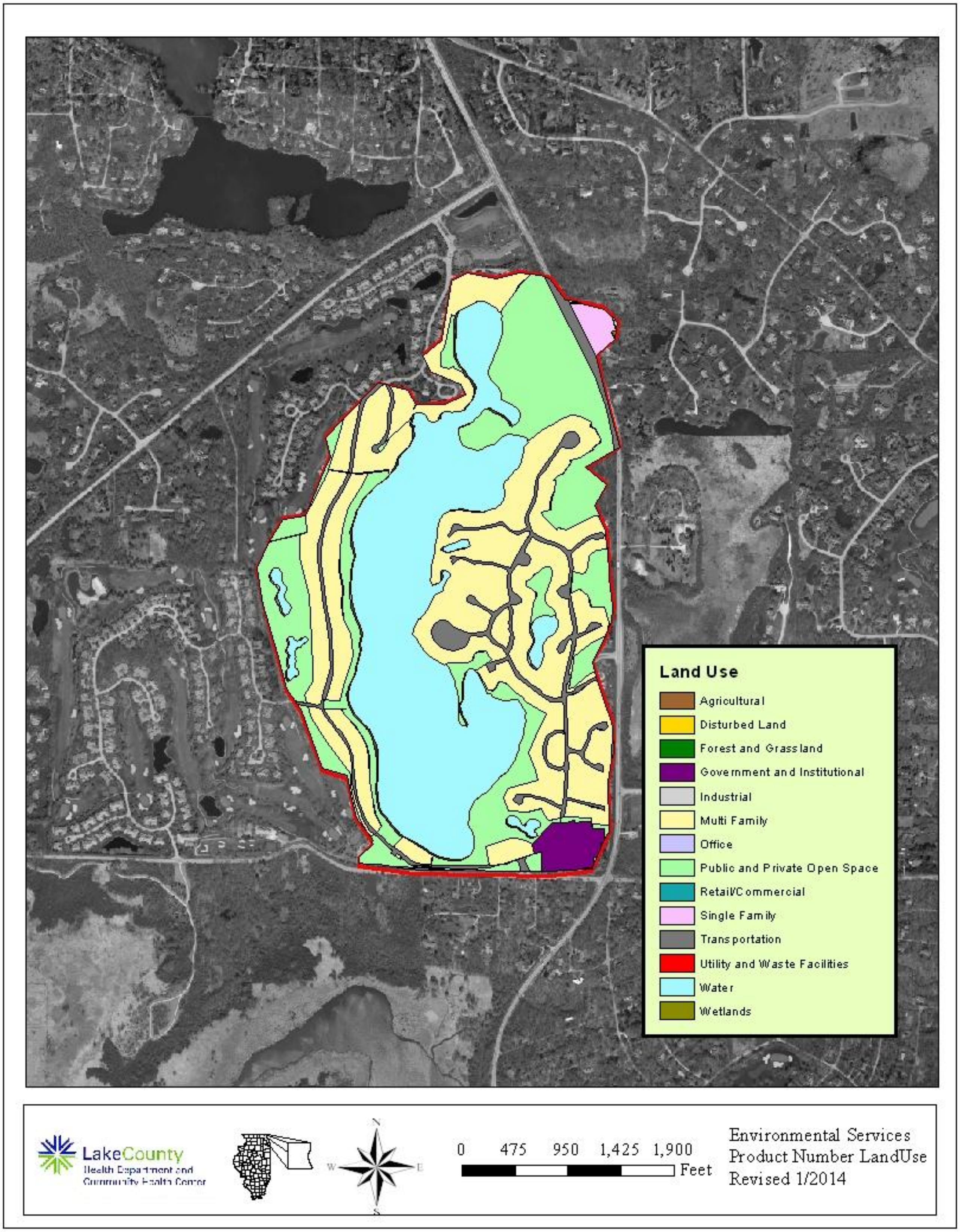
APPENDIX A

FIGURES AND TABLES
LAKE BARRINGTON
2013

Figure 1. LCHD water quality sampling point – Lake Barrington 2013.

Figure 2. Approximate watershed boundary of Lake Barrington, 2013.

Figure 3. Land use of Lake Barrington watershed, 2013. Based upon 2010 imagery.



.

Table 1. Approximate land uses and retention time for Lake Barrington, 2013.

Land Use	Acreage	% of Total
Agricultural	0.00	0.0%
Disturbed Land	0.00	0.0%
Forest and Grassland	0.00	0.0%
Government and Institutional	5.10	1.8%
Multi Family	114.29	39.3%
Office	0.00	0.0%
Public and Private Open Space	72.80	25.0%
Retail/Commercial	0.00	0.0%
Single Family	2.37	0.8%
Transportation	2.69	0.9%
Utility and Waste Facilities	0.00	0.0%
Water	93.56	32.2%
Wetlands	0.05	0.0%
Total Acres	**290.87**	**100.0%**

Land Use	Acreage	Runoff Coeff.	Estimated Runoff, acft.	% Total of Estimated Runoff
Agricultural	0.00	0.05	0.0	0.0%
Disturbed Land	0.00	0.05	0.0	0.0%
Forest and Grassland	0.00	0.05	0.0	0.0%
Government and Institutional	5.10	0.50	7.0	3.5%
Multi Family	114.29	0.50	157.1	77.6%
Office	0.00	0.85	0.0	0.0%
Public and Private Open Space	72.80	0.15	30.0	14.8%
Retail/Commercial	0.00	0.85	0.0	0.0%
Single Family	2.37	0.30	2.0	1.0%
Transportation	2.69	0.85	6.3	3.1%
Utility and Waste Facilities	0.00	0.30	0.0	0.0%
Water	93.56	0.00	0.0	0.0%
Wetlands	0.05	0.05	0.0	0.0%
TOTAL	**290.87**		**202.4**	100.0%

Lake volume	**701.35**	**acre-feet**
Retention Time (years)= lake volume/runoff	**3.46**	**years**
	1264.53	**days**

Table 2. Water quality data for Lake Barrington 2001, 2007 and 2013.

2013	Epilimnion															
DATE	DEPTH	ALK	TKN	NH_3-N	NO_2+NO_3-N*	TP	SRP	TDS**	Cl^-	TSS	TS	TVS	SECCHI	COND	pH	DO
21-May	3	155	0.73	<0.100	<0.05	0.015	<0.005	372	122	1.2	465	122	10.67	0.6463	8.20	9.14
18-Jun	3	156	0.78	<0.100	<0.05	0.015	<0.005	435	121	2.1	494	137	NR	0.7706	8.15	8.68
16-Jul	3	145	0.89	<0.100	<0.05	0.033	<0.005	371	106	3.0	421	99	6.95	0.6439	8.59	9.54
20-Aug	3	136	1.68	<0.100	<0.05	0.088	<0.005	358	109	9.7	402	116	3.43	0.6178	8.65	11.58
17-Sep	3	133	1.94	0.318	<0.05	0.150	0.070	345	108	5.6	389	102	3.45	0.5921	7.95	4.86
	Average	145	1.20	0.272[k]	<0.05	0.060	0.07[k]	376	113	4.4	434	115	6.12	0.6541	8.31	8.76

2007	Epilimnion															
DATE	DEPTH	ALK	TKN	NH_3-N	NO_2+NO_3-N	TP	SRP	TDS	Cl^-	TSS	TS	TVS	SECCHI	COND	pH	DO
9-May	3	161	0.69	<0.100	<0.05	<0.010	<0.005	NA	127	2.4	442	93	9.48	0.7910	8.52	10.90
13-Jun	3	159	0.71	<0.100	<0.05	<0.010	<0.005	NA	131	1.2	467	121	11.81	0.7870	8.39	9.10
11-Jul	3	163	1.15	<0.100	<0.05	0.088	0.012	NA	133	7.8	494	148	4.43	0.8230	8.59	7.07
8-Aug	3	112	2.63	0.257	<0.05	0.114	<0.005	NA	124	13.0	417	134	1.64	0.6830	8.36	2.03
12-Sep	3	138	1.92	0.287	<0.05	0.114	0.009	NA	113	9.2	401	103	2.62	0.6750	8.29	4.02
	Average	147	1.42	0.272[k]	<0.05	0.105[k]	0.011[k]	NA	126	6.7	444	120	6.00	0.7518	8.43	6.62

2001	Epilimnion															
DATE	DEPTH	ALK	TKN	NH_3-N	NO_3-N*	TP	SRP	TDS	Cl^-	TSS	TS	TVS	SECCHI	COND	pH	DO
23-May	3	174	<0.50	<0.100	<0.05	0.027	<0.005	384	NA	2.0	384	104	12.00[a]	0.6345	8.05	7.36
27-Jun	3	164	0.73	<0.100	<0.05	0.023	<0.005	370	NA	0.2	382	112	12.67	0.6272	8.25	8.65
1-Aug	3	142	2.31	<0.100	<0.05	0.117	<0.005	344	NA	18.0	369	123	1.72	0.5791	8.63	12.94
29-Aug	3	154	2.16	<0.100	<0.05	0.154	<0.005	306	NA	12.0	354	109	1.74	0.5821	8.49	8.41
25-Sep	3	151	2.07	<0.100	<0.05	0.157	<0.005	346	NA	15.8	352	103	1.51	0.5749	8.04	6.75
	Average	157	1.82[k]	<0.100	<0.05	0.096	<0.005	350	NA	9.6	368	110	5.93[b]	0.5996	8.29	8.82

Table 2. Water quality data for Lake Barrington 2001, 2007 and 2013.

2013	Hypoliminion															
DATE	DEPTH	ALK	TKN	NH_3-N	NO_2+NO_3-N	TP	SRP	TDS**	Cl^-	TSS	TS	TVS	SECCHI	COND	pH	DO
21-May	9	155	0.70	<0.100	<0.05	0.013	<0.005	355	121	<1.0	444	96	NA	0.6475	7.93	7.19
18-Jun	8	156	0.83	<0.100	<0.05	0.040	<0.005	428	120	1.6	489	141	NA	0.7703	8.12	8.55
16-Jul	9	152	1.01	<0.100	<0.05	0.038	<0.005	356	103	5.2	410	99	NA	0.6491	7.54	1.84
20-Aug	9	145	1.57	<0.100	<0.05	0.220	0.162	366	109	4.8	389	90	NA	0.6335	7.42	0.37
17-Sep	10	134	2.01	0.309	<0.05	0.175	0.075	346	109	5.8	388	97	NA	0.5928	7.87	4.57
	Average	148	1.22	0.608[k]	<0.05	0.097	0.065[k]	NA	112	4.4	424	105	NA	0.6586	7.78	4.50

2007	Hypoliminion															
DATE	DEPTH	ALK	TKN	NH_3-N	NO_2+NO_3-N	TP	SRP	TDS	Cl^-	TSS	TS	TVS	SECCHI	COND	pH	DO
9-May	10	165	0.71	<0.100	<0.05	0.023	<0.005	NA	128	2.4	447	103	NA	0.7990	8.19	8.46
13-Jun	10	160	0.81	<0.100	<0.05	0.015	<0.005	NA	131	2.2	489	141	NA	0.7910	8.21	7.20
11-Jul	10	163	1.17	<0.100	<0.05	0.070	0.010	NA	133	6.6	472	127	NA	0.8210	8.60	6.73
8-Aug	11	141	2.12	0.920	<0.05	0.264	0.179	NA	132	7.2	439	144	NA	0.7840	7.55	0.22
12-Sep	9	138	1.89	0.295	<0.05	0.121	0.006	NA	114	8.6	403	99	NA	0.6740	8.18	3.66
	Average	153	1.34	0.608[k]	<0.05	0.099	0.065[k]	NA	128	5.4	450	123	NA	0.7738	8.15	5.25

2001	Hypoliminion															
DATE	DEPTH	ALK	TKN	NH_3-N	NO_3-N*	TP	SRP	TDS	Cl^-	TSS	TS	TVS	SECCHI	COND	pH	DO
23-May	11	175	<0.50	<0.100	<0.05	0.015	<0.005	372	NA	1.6	379	118	NA	0.6351	8.06	7.45
27-Jun	10	169	0.77	<0.100	<0.05	0.032	<0.005	358	NA	1.5	381	97	NA	0.6349	7.71	4.68
1-Aug	9	167	1.62	0.393	<0.05	0.152	0.079	352	NA	8.4	383	129	NA	0.6370	7.51	0.05
29-Aug	9	156	2.10	0.382	<0.05	0.163	0.009	308	NA	9.4	353	103	NA	0.6068	7.29	0.07
25-Sep	8	152	2.04	<0.100	<0.05	0.142	<0.005	349	NA	16.4	356	110	NA	0.5749	8.04	6.62
	Average	164	1.63[k]	0.388[k]	<0.05	0.101	0.044[k]	348	NA	7.5	370	111	NA	0.6177	7.72	3.77

Table 2. Water quality data for Lake Barrington 2001, 2007 and 2013.

Glossary

ALK = Alkalinity, mg/L $CaCO_3$
TKN = Total Kjeldahl nitrogen, mg/L
NH_3-N = Ammonia nitrogen, mg/L
NO_2+NO_3-N = Nitrate + Nitrite nitrogen, mg/L
NO_3-N = Nitrate nitrogen, mg/L
TP = Total phosphorus, mg/L
SRP = Soluble reactive phosphorus, mg/L
Cl^- = Chloride, mg/L
TDS = Total dissolved solids, mg/L
TSS = Total suspended solids, mg/L
TS = Total solids, mg/L
TVS = Total volatile solids, mg/L
SECCHI = Secchi disk depth, ft.
COND = Conductivity, milliSiemens/cm
DO = Dissolved oxygen, mg/L

a = Secchi depth was obstructed by the bottom
b = Secchi disk was on the bottom at least one month and therefore the average could have been deeper
k = Denotes that the actual value is known to be less than the value presented.
NA= Not applicable
* = Prior to 2006 only Nitrate - nitrogen was analyzed
** = In 2013 TDS was estimated from conductivity.

Figure 4. Secchi depths of Lake Barrington, 2001, 2007 and 2013.

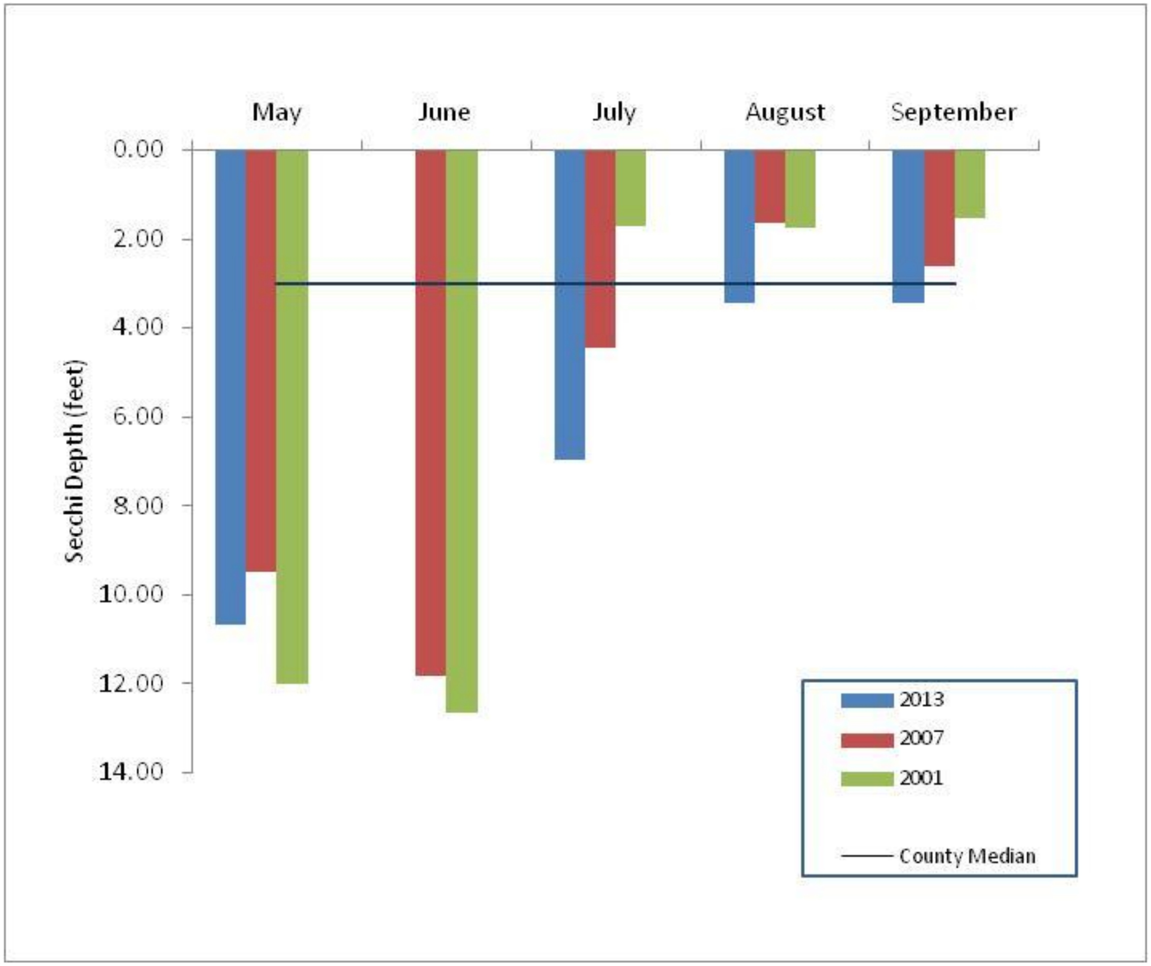


Table 3. 2000 - 2013 Water Quality Parameters, Statistics Summary

	ALKoxic <=3ft00-2013			ALKanoxic 2000-2013	
Average	**164**		Average	**198**	
Median	**159**		Median	**187**	
Minimum	**65**	**IMC**	Minimum	**103**	**Heron Pond**
Maximum	**330**	**Flint Lake**	Maximum	**470**	**Lake Marie**
STD	**42**		STD	**53**	
n =	**863**		n =	**231**	

	Condoxic <=3ft00-2013			Condanoxic 2000-2013	
Average	**0.8667**		Average	**1.0056**	
Median	**0.7875**		Median	**0.8360**	
Minimum	**0.2260**	**Schreiber Lake**	Minimum	**0.3210**	**Lake Kathyrn, Schreiber Lake**
Maximum	**6.8920**	**IMC**	Maximum	**7.4080**	**IMC**
STD	**0.5239**		STD	**0.8091**	
n =	**860**		n =	**231**	

	NO3-N, Nitrate+Nitrite,oxic <=3ft00-2013			NH3-Nanoxic 2000-2013	
Average	**0.454**		Average	**2.211**	
Median	**0.145**		Median	**1.530**	
Minimum	**<0.05**	***ND**	Minimum	**<0.1**	***ND**
Maximum	**9.670**	**South Churchill Lake**	Maximum	**18.400**	**Taylor Lake**
STD	**1.016**		STD	**2.425**	
n =	**863**		n =	**231**	

*ND = Many lakes had non-detects (74.5%)
Only compare lakes with detectable concentrations to the statistics above
Beginning in 2006, Nitrate+Nitrite was measured.

*ND = 29.1% Non-detects from 32 different lakes

	pHoxic <=3ft00-2013			pHanoxic 2000-2013	
Average	**8.35**		Average	**7.27**	
Median	**8.34**		Median	**7.24**	
Minimum	**7.06**	**Deer Lake**	Minimum	**6.24**	**Cranberry Lake, Banana Pond**
Maximum	**10.40**	**Summerhill Estates**	Maximum	**9.16**	**White Lake**
STD	**0.46**		STD	**0.45**	
n =	**860**		n =	**231**	

	All Secchi 2000-2013	
Average	**4.35**	
Median	**3.00**	
Minimum	**0.18**	**McDonald 2/Ozaukee/Rollins 2**
Maximum	**29.23**	**Bangs Lake**
STD	**3.63**	
n =	**783**	

LakeCounty
Health Department and
Community Health Center

Table 3. 2000 - 2013 Water Quality Parameters, Statistics Summary

	TKNoxic <=3ft00-2013	
Average	**1.525**	
Median	**1.170**	
Minimum	**<0.1**	***ND**
Maximum	**41.200**	**Almond Marsh**
STD	**1.726**	
n =	**863**	

*ND = 3.5% Non-detects from 14 different lakes

	TKNanoxic 2000-2013	
Average	**2.891**	
Median	**2.210**	
Minimum	**<0.5**	***ND**
Maximum	**21.000**	**Taylor Lake**
STD	**2.372**	
n =	**231**	

*ND = 3.5% Non-detects from 4 different lakes

	TPoxic <=3ft00-2013	
Average	**0.114**	
Median	**0.067**	
Minimum	**<0.01**	***ND**
Maximum	**7.270**	**Almond Marsh**
STD	**0.276**	
n =	**863**	

*ND = 1.8% Non-detects from 6 different lakes

	TPanoxic 2000-2013	
Average	**0.323**	
Median	**0.180**	
Minimum	**0.012**	**Independence Grove, W. Loon**
Maximum	**3.800**	**Taylor Lake**
STD	**0.410**	
n =	**231**	

	TSSall <=3ft00-2013	
Average	**15.8**	
Median	**8.0**	
Minimum	**<1**	***ND**
Maximum	**220.0**	**Rollins 2**
STD	**22.5**	
n =	**848**	

*ND = 1.3% Non-detects from 8 different lakes

	TVSoxic <=3ft00-2013	
Average	**124.7**	
Median	**119.0**	
Minimum	**34.0**	**Pulaski Pond**
Maximum	**1090.0**	**Almond Marsh**
STD	**50.7**	
n =	**818**	

No 2002 IEPA Chain Lakes

	TDSoxic <=3ft00-2004	
Average	**470**	
Median	**454**	
Minimum	**150**	**Lake Kathryn, White**
Maximum	**1340**	**IMC**
STD	**169**	
n =	**745**	

No 2002 IEPA Chain Lakes.

	CLanoxic 2000-2013	
Average	**195**	
Median	**135**	
Minimum	**3.5**	**Schreiber Lake**
Maximum	**2390**	**IMC**
STD	**310**	
n =	**178**	

	CLoxic 2000-2013	
Average	**179**	
Median	**145**	
Minimum	**2.7**	**Schreiber Lake**
Maximum	**2760**	**IMC**
STD	**200**	
n =	**723**	

Anoxic conditions are defined <=1 mg/l D.O.
pH Units are equal to the -Log of [H] ion activity
Conductivity units are in MilliSiemens/cm
Secchi Disk depth units are in feet
All others are in mg/L

Minimums and maximums are based on data from all lakes from 2000-2013 (n=4476).

Average, median and STD are based on data from the most recent water quality sampling year for each lake.

LCHD Environmental Services ~ 1/21/2014

LakeCounty
Health Department and
Community Health Center

Table 4. Average Secchi depths measured from lakes in Lake County, 2000-2013.

RANK	LAKE NAME	SECCHI AVE	TSIsd
1	Windward Lake	14.28	38.8
2	Lake Carina	13.21	39.9
3	Druce Lake	12.25	41.0
4	Pulaski Pond	11.69	41.7
5	West Loon Lake	11.55	41.9
6	Indpendence Grove	11.50	41.9
7	Sterling Lake	11.35	42.1
8	Lake Zurich	10.40	43.4
9	Davis Lake	9.65	44.4
10	Harvey Lake	9.47	44.7
11	Little Silver Lake	9.42	44.8
12	Old School Lake	9.40	44.8
13	Lake Kathryn	9.39	44.8
14	Dugdale Lake	9.22	45.1
15	Dog Training Pond	9.04	45.4
16	Bangs Lake	8.90	45.0
17	Banana Pond	8.85	45.7
18	Deep Lake	8.83	45.7
19	Stone Quarry Lake	8.81	45.8
20	Lake of the Hollow	8.74	45.9
21	Cedar Lake	8.25	47.0
22	Cross Lake	8.18	46.8
23	Ames Pit	8.14	46.9
24	Briarcrest Pond	8.00	47.1
25	Cranberry Lake	7.88	46.0
26	Sand Lake	7.48	48.1
27	Sand Pond (IDNR)	7.42	48.2
28	Timber Lake (North)	7.37	48.3
29	Lake Miltmore	7.35	48.4
30	Lake Leo	7.31	48.4
31	Schreiber Lake	7.25	48.6
32	Nielsen Pond	7.23	48.6
33	Honey Lake	7.17	48.7
34	Lake Minear	7.13	48.8
35	Round Lake	7.01	49.1
36	Highland Lake	6.97	49.1
37	Channel Lake	6.65	49.8
38	Third Lake	6.60	50.0
39	Lake Catherine	6.58	50.0
40	Lake Helen	6.43	50.3
41	Sun Lake	6.33	50.5
42	Wooster Lake	6.21	51.0
43	Lake Barrington	6.12	51.0
44	Lake Fairfield	5.89	51.6
45	Countryside Lake	5.56	52.0
46	Gages Lake	5.45	52.7
47	Owens Lake	5.30	53.1
48	Valley Lake	5.05	53.8
49	McGreal Lake	5.04	53.8

Table 4. Average Secchi depths measured from lakes in Lake County, 2000-2013.

RANK	LAKE NAME	SECCHI AVE	TSIsd
50	Old Oak Lake	4.85	54.4
51	Waterford Lake	4.70	54.8
52	Lake Linden	4.60	55.1
53	Peterson Pond	4.51	55.4
54	Timber Lake (South)	4.46	56.0
55	Crooked Lake	4.39	55.8
56	Mary Lee Lake	4.35	55.9
57	Butler Lake	4.35	55.9
58	Crooked Lake	4.28	56.2
59	Deer Lake	4.20	56.4
60	Seven Acre Lake	4.18	56.5
61	Lambs Farm Lake	4.17	56.5
62	Grays Lake	4.08	56.9
63	Lake Naomi	4.05	57.0
64	White Lake	3.96	57.3
65	Hook Lake	3.95	57.3
66	Turner Lake	3.92	57.4
67	North Tower Lake	3.89	60.0
68	Leisure Lake	3.85	57.7
69	Salem Lake	3.77	58.0
70	Lake Fariview	3.75	58.0
71	Countryside Glen Lake	3.64	58.5
72	Taylor Lake	3.52	59.0
73	Hastings Lake	3.52	59.0
74	Duck Lake	3.49	59.1
75	Fish Lake	3.47	59.2
76	Bishop Lake	3.47	59.2
77	Lake Lakeland Estates	3.41	59.0
78	Lake Holloway	3.40	59.5
79	Stockholm Lake	3.38	59.6
80	East Loon Lake	3.30	59.9
81	Bresen Lake	3.28	60.0
82	Summerhill Estates Lake	3.27	60.0
83	Lucky Lake	3.22	60.3
84	Diamond Lake	3.17	60.5
85	Liberty Lake	3.16	60.5
86	International Mining and Chemical Lake	3.08	60.9
87	Lake Christa	3.01	61.2
88	Lucy Lake	2.99	61.3
89	Long Lake	2.87	62.0
90	Bluff Lake	2.85	62.0
91	St. Mary's Lake	2.79	62.3
92	Werhane Lake	2.71	62.8
93	Petite Lake	2.66	63.0
94	East Meadow Lake	2.61	63.3
95	Buffalo Creek Reservoir 1	2.60	64.0
96	Kemper Lake 1	2.56	63.6
97	Broberg Marsh	2.50	63.9
98	Antioch Lake	2.48	64.0

Table 4. Average Secchi depths measured from lakes in Lake County, 2000-2013.

RANK	LAKE NAME	SECCHI AVE	TSIsd
99	Spring Lake	2.46	64.2
100	Little Bear Lake	2.38	64.6
101	Island Lake	2.32	65.0
102	Tower Lake	2.31	56.0
103	Buffalo Creek Reservoir 2	2.30	67.0
104	Woodland Lake	2.28	65.0
105	Lake Marie	2.25	65.4
106	Rivershire Pond 2	2.23	65.6
107	Lake Charles	2.20	65.8
108	College Trail Lake	2.18	65.9
109	Loch Lomond	2.17	66.0
110	Echo Lake	2.11	66.4
111	Eagle Lake (S1)	2.10	66.4
112	West Meadow Lake	2.07	66.6
113	Forest Lake	2.04	66.9
114	Grand Ave Marsh	2.03	66.9
115	Columbus Park Lake	2.03	66.9
116	Grassy Lake	2.00	67.1
117	Sylvan Lake	1.98	67.3
118	Bittersweet Golf Course #13	1.98	67.3
119	Fischer Lake	1.96	67.4
120	Pistakee Lake	1.88	68.0
121	Kemper Lake 2	1.77	68.9
122	Fourth Lake	1.77	68.9
123	Nippersink Lake	1.73	69.2
124	Deer Lake Meadow Lake	1.73	69.2
125	Lake Louise	1.68	69.7
126	Willow Lake	1.63	70.1
127	Slough Lake	1.63	70.1
128	Rasmussen Lake	1.62	70.2
129	Lake Farmington	1.62	70.2
130	Half Day Pit	1.60	70.4
131	Dunn's Lake	1.54	70.9
132	Longview Meadow Lake	1.51	71.2
133	Lake Matthews	1.41	72.2
134	Fox Lake	1.37	72.6
135	Grass Lake	1.33	73.0
136	Big Bear Lake	1.32	73.1
137	Lake Nipperink	1.28	73.6
138	Redhead Lake	1.27	73.7
139	Lake Eleanor	1.16	75.0
140	McDonald Lake 1	1.13	75.4
141	Lake Napa Suwe	1.06	105.0
142	Rollins Savannah 1	1.05	76.4
143	Osprey Lake	1.03	76.7
144	Manning's Slough	1.00	77.1
145	Rollins Savannah 2	0.95	77.9
146	Dog Bone Lake	0.94	78.0
147	Redwing Marsh	0.88	79.0

Table 4. Average Secchi depths measured from lakes in Lake County, 2000-2013.

RANK	LAKE NAME	SECCHI AVE	TSIsd
148	Flint Lake Oulet	0.83	79.8
149	Slocum Lake	0.81	80.0
150	Fairfield Marsh	0.81	80.2
151	Oak Hills Lake	0.79	80.5
152	South Churchill Lake	0.73	81.7
153	Lake Forest Pond	0.71	82.1
54	ADID 127	0.66	83.1
155	North Churchill Lake	0.61	84.3
156	Hidden Lake	0.56	85.5
157	Ozaukee Lake	0.51	86.8
158	McDonald Lake 2	0.50	87.1

Table 4. Lake County Average TSI phosphorus (TSIp) Ranking 2000-2013

RANK	LAKE NAME	TP AVE	TSIp
1	Lake Carina	0.0100	37.35
2	Sterling Lake	0.0100	37.35
3	Indpendence Grove	0.0130	41.14
4	Lake Zurich	0.0135	41.68
5	Druce Lake	0.0140	42.00
6	Windward Lake	0.0160	44.13
7	Sand Pond (IDNR)	0.0165	44.57
8	West Loon	0.0170	45.00
9	Pulaski Pond	0.0180	45.83
10	Banana Pond	0.0200	47.35
11	Cedar Lake	0.0200	47.35
12	Gages Lake	0.0200	47.35
13	Lake Kathryn	0.0200	47.35
14	Lake Minear	0.0200	47.35
15	Highland Lake	0.0202	47.49
16	Lake Miltmore	0.0210	48.00
17	Timber Lake (North)	0.0210	48.05
18	Cross Lake	0.0220	48.72
19	Dog Training Pond	0.0220	48.72
20	Sun Lake	0.0220	48.72
21	Deep Lake	0.0230	49.36
22	Lake of the Hollow	0.0230	49.36
23	Round Lake	0.0230	49.36
24	Stone Quarry Lake	0.0230	49.36
25	Bangs Lake	0.0240	50.00
26	Little Silver Lake	0.0250	50.57
27	Lake Leo	0.0260	51.13
28	Cranberry Lake	0.0270	51.68
29	Dugdale Lake	0.0270	51.68
30	Peterson Pond	0.0270	51.68
31	Fourth Lake	0.0360	53.00
32	Lake Fairfield	0.0300	53.20
33	Third Lake	0.0300	53.20
34	Lake Catherine	0.0310	53.67
35	Lambs Farm Lake	0.0310	53.67
36	Old School Lake	0.0310	53.67
37	Grays Lake	0.0310	54.00
38	Harvey Lake	0.0320	54.50
39	Hendrick Lake	0.0340	55.00
40	Honey Lake	0.0340	55.00
41	Sand Lake	0.0380	56.00
42	Sullivan Lake	0.0370	56.22
43	Channel Lake	0.0380	56.60
44	Ames Pit	0.0390	56.98
45	Diamond Lake	0.0390	56.98
46	East Loon	0.0400	57.34
47	Schreiber Lake	0.0400	57.34
48	Waterford Lake	0.0400	57.34
49	Hook Lake	0.0410	57.70
50	Duck Lake	0.0430	58.39
51	Nielsen Pond	0.0450	59.04
52	Seven Acre Lake	0.0460	59.36

Table 4. Lake County Average TSI phosphorus (TSIp) Ranking 2000-2013

RANK	LAKE NAME	TP AVE	TSIp
53	Turner Lake	0.0460	59.36
54	Willow Lake	0.0460	59.36
55	East Meadow Lake	0.0480	59.97
56	Lucky Lake	0.0480	59.97
57	Old Oak Lake	0.0490	60.27
58	College Trail Lake	0.0500	60.56
59	Hastings Lake	0.0520	61.13
60	Butler Lake	0.0530	61.40
61	West Meadow Lake	0.0530	61.40
62	Lucy Lake	0.0550	61.94
63	Lake Linden	0.0570	62.45
64	Lake Christa	0.0580	62.70
65	Owens Lake	0.0580	62.70
66	Briarcrest Pond	0.0580	63.00
67	Lake Barrington	0.0600	63.10
68	Lake Lakeland Estates	0.0620	63.66
69	Lake Naomi	0.0620	63.66
70	Lake Tranquility (S1)	0.0620	63.66
71	Liberty Lake	0.0630	63.89
72	North Tower Lake	0.0630	63.89
73	Werhane Lake	0.0630	63.89
74	Countryside Glen Lake	0.0640	64.12
75	Countryside Lake	0.0660	65.00
76	Davis Lake	0.0650	64.34
77	Leisure Lake	0.0650	64.34
78	St. Mary's Lake	0.0670	64.78
79	Little Bear Lake	0.0680	65.00
80	Buffalo Creek Reservoir 1	0.0680	65.00
81	Mary Lee Lake	0.0680	65.00
82	Wooster Lake	0.0700	65.41
83	Crooked Lake	0.0710	66.00
84	Timber Lake (South)	0.0720	65.82
85	Lake Helen	0.0720	65.82
86	Grandwood Park Lake	0.0720	65.82
87	ADID 203	0.0730	66.02
88	Bluff Lake	0.0730	66.02
89	Long Lake	0.0730	66.02
90	Spring Lake	0.0730	66.02
91	Broberg Marsh	0.0780	66.97
92	Woodland Lake	0.0800	68.00
93	Redwing Slough	0.0822	67.73
94	Tower Lake	0.0830	67.87
95	Petite Lake	0.0830	67.87
96	Lake Marie	0.0850	68.21
97	Potomac Lake	0.0850	68.21
98	White Lake	0.0862	68.42
99	Grand Ave Marsh	0.0870	68.55
100	North Churchill Lake	0.0870	68.55
101	McDonald Lake 1	0.0880	68.71
102	Lake Fairview	0.0890	68.00
103	Rivershire Pond 2	0.0900	69.04
104	South Churchill Lake	0.0900	69.04

Table 4. Lake County Average TSI phosphorus (TSIp) Ranking 2000-2013

RANK	LAKE NAME	TP AVE	TSIp
105	McGreal Lake	0.0910	69.20
106	Lake Charles	0.0930	69.40
107	Deer Lake	0.0940	69.66
108	Dunn's Lake	0.0950	69.82
109	Eagle Lake (S1)	0.0950	69.82
110	International Mine and Chemical Lake	0.0950	69.82
111	Valley Lake	0.0950	69.82
112	Big Bear Lake	0.0960	69.97
113	Buffalo Creek Reservoir 2	0.0960	69.97
114	Fish Lake	0.0960	69.97
115	Lochanora Lake	0.0960	69.97
116	Nippersink Lake	0.1000	70.56
117	Sylvan Lake	0.1000	70.56
118	Longview Meadow Lake	0.1020	70.84
119	Lake Forest Pond	0.1070	71.53
120	Bittersweet Golf Course #13	0.1100	71.93
121	Fox Lake	0.1100	71.93
122	Kemper 2	0.1100	71.93
123	Middlefork Savannah Outlet 1	0.1120	72.00
124	Osprey Lake	0.1110	72.06
125	Bresen Lake	0.1130	72.32
126	Round Lake Marsh North	0.1130	72.32
127	Deer Lake Meadow Lake	0.1160	72.70
128	Taylor Lake	0.1180	72.94
129	Island Lake	0.1210	73.00
130	Columbus Park Lake	0.1230	73.54
131	Lake Nipperink	0.1240	73.66
132	Echo Lake	0.1250	73.77
133	Grass Lake	0.1290	74.23
134	Lake Holloway	0.1320	74.56
135	Redhead Lake	0.1410	75.51
136	Antioch Lake	0.1450	75.91
137	Slocum Lake	0.1500	77.00
138	Lakewood Marsh	0.1510	76.50
139	Pond-A-Rudy	0.1510	76.50
140	Lake Matthews	0.1520	76.59
141	Forest Lake	0.1540	76.78
142	Middlefork Savannah Outlet 2	0.1590	77.00
143	Pistakee Lake	0.1590	77.24
144	Grassy Lake	0.1610	77.42
145	Salem Lake	0.1650	77.78
146	Half Day Pit	0.1690	78.12
147	Lake Eleanor	0.1810	79.11
148	Lake Farmington	0.1850	79.43
149	Lake Louise	0.1850	79.43
150	ADID 127	0.1890	79.74
151	Lake Napa Suwe	0.1940	80.00
152	Patski Pond	0.1970	80.33
153	Dog Bone Lake	0.1990	80.48
154	Summerhill Estates Lake	0.1990	80.48
155	Redwing Marsh	0.2070	81.05
156	Stockholm Lake	0.2082	81.13

Table 4. Lake County Average TSI phosphorus (TSIp) Ranking 2000-2013

RANK	LAKE NAME	TP AVE	TSIp
157	Bishop Lake	0.2160	81.66
158	Ozaukee Lake	0.2200	81.93
159	Kemper 1	0.2220	82.08
160	Hidden Lake	0.2240	82.19
161	McDonald Lake 2	0.2250	82.28
162	Fischer Lake	0.2280	82.44
163	Oak Hills Lake	0.2790	85.35
164	Loch Lomond	0.2950	86.16
165	Heron Pond	0.2990	86.35
166	Rollins Savannah 1	0.3070	87.00
167	Fairfield Marsh	0.3260	87.60
168	ADID 182	0.3280	87.69
169	Manning's Slough	0.3820	90.22
170	Slough Lake	0.3860	90.03
171	Rasmussen Lake	0.4860	93.36
172	Albert Lake, Site II, outflow	0.4950	93.67
173	Flint Lake Outlet	0.5000	93.76
174	Rollins Savannah 2	0.5870	96.00
175	Almond Marsh	1.9510	113.00

Table 5. Multiparameter data for Lake Barrington, 2013.

Lake Barrington 2013 Multiparameter data

Date MMDDYY	Text Depth feet	Dep25 Feet	Temp øC	DO mg/l	DO% Sat	SpCond mS/cm	pH Units	PAR æE/s/mý	Depth of Light Meter feet	% Light Transmission Average	Extinction Coefficient
											0.404
5/21/2013	0.25	0.18	20.79	8.94	100.7	0.0004	7.88	5301	Surface		
5/21/2013	1	1.02	22.50	9.12	106.4	0.6463	8.20	4676	Surface	100%	
5/21/2013	2	1.98	22.51	9.13	106.4	0.6462	8.20	2033	-0.65	47%	-1.28
5/21/2013	3	3.01	22.47	9.14	106.5	0.6463	8.20	459	0.31	11%	2.69
5/21/2013	4	4.01	22.47	9.13	106.4	0.6465	8.18	299	1.34	7%	1.11
5/21/2013	6	6.05	22.45	9.12	106.2	0.6465	8.18	248	2.34	6%	0.18
5/21/2013	8	8.03	22.4	8.93	104.0	0.6464	8.15	183	4.38	4%	0.04
5/21/2013	10	10.03	19.11	5.37	58.6	0.6484	7.70	130	6.36	3%	0.05
5/21/2013	12	12.48	18.61	4.01	43.3	0.6515	7.53	76	8.36	2%	0.04

Date MMDDYY	Text Depth feet	Dep25 Feet	Temp øC	DO mg/l	DO% Sat	SpCond mS/cm	pH Units	PAR æE/s/mý	Depth of Light Meter feet	% Light Transmission Average	Extinction Coefficient
											0.259
6/18/2013	0.25	0.50	23.8	8.78	103.9	0.7702	8.11	4153	Surface		
6/18/2013	1	1.01	23.81	8.65	102.3	0.771	8.13	4306	Surface	100%	
6/18/2013	2	2.04	23.80	8.68	102.7	0.7711	8.15	1942	0.37	45%	2.15
6/18/2013	3	3.47	23.74	8.68	102.6	0.7706	8.15	1570	1.8	36%	0.12
6/18/2013	4	4.01	23.70	8.66	102.2	0.7707	8.14	1316	2.34	31%	0.08
6/18/2013	5	5.73	23.74	8.62	101.9	0.7706	8.14	964	4.06	22%	0.08
6/18/2013	6	6.01	23.68	8.59	101.4	0.7708	8.13	828	4.34	19%	0.04
6/18/2013	7	7.01	23.64	8.57	101.1	0.7706	8.12	627	5.34	15%	0.05
6/18/2013	8	8.26	23.60	8.55	100.8	0.7703	8.12	606	6.59	14%	0.01
6/18/2013	9	9.01	23.57	8.56	100.8	0.7712	8.11	336	7.34	8%	0.08
6/18/2013	10	10.01	23.56	8.57	101.0	0.7702	8.11	259	8.34	6%	0.03
6/18/2013	11	11.00	23.58	4.18	49.3	0.7703	8.07	359	9.33	8%	-0.03

Date MMDDYY	Text Depth feet	Dep25 Feet	Temp øC	DO mg/l	DO% Sat	SpCond mS/cm	pH Units	PAR æE/s/mý	Depth of Light Meter feet	% Light Transmission Average	Extinction Coefficient
											0.209
7/16/2013	0.25	0.74	28.8	9.39	119.3	0.6437	88.58	3799	Surface		
7/16/2013	1	1.21	28.8	9.83	126.0	0.6438	8.58	3858	Surface	100%	
7/16/2013	2	2.01	28.7	9.57	122.4	0.6436	8.58	3173	0.34	74%	0.57
7/16/2013	3	3.00	28.6	9.54	121.9	0.6438	8.58	443	1.33	10%	1.48
7/16/2013	4	4.05	28.6	9.54	121.8	0.6438	8.58	1048	2.38	24%	-0.36
7/16/2013	5	5.08	28.6	9.48	121.0	0.6436	8.57	593	3.41	14%	0.17
7/16/2013	6	6.64	28.2	8.58	108.9	0.6439	8.44	422	4.97	10%	0.07
7/16/2013	7	7.16	27.6	7.74	97.0	0.6452	8.28	365	5.49	8%	0.03
7/16/2013	8	8.06	26.8	4.38	54.1	0.6479	7.86	341	6.39	8%	0.01
7/16/2013	9	9.46	26.1	1.84	22.5	0.6481	7.52	221	7.79	5%	0.06
7/16/2013	10	10.09	25.2	0.58	7.0	0.6499	7.39	167	8.42	4%	0.03
7/16/2013	11	11.04	24.6	0.31	3.7	0.6546	7.41	117	9.37	3%	0.04
7/16/2013	12	12.03	23.8	0.22	2.5	0.6606	7.52	54	10.36	1%	0.07

Table 5. Multiparameter data for Lake Barrington, 2013.

Date MMDDYY	Text Depth feet	Dep25 feet	Temp øC	DO mg/l	DO% Sat	SpCond mS/cm	pH Units	PAR æE/s/mý	Depth of Light Meter feet	% Light Transmission Average	Extinction Coefficient
											0.705
8/20/2013	0	0.00	24.69	10.57	127.9	0.6171	8.67	3708	Surface		
8/20/2013	1	1.00	24.65	11.86	142.2	0.6174	8.68	3773	Surface	100%	
8/20/2013	2	2.00	24.61	11.79	140.6	0.618	8.65	461	0.33	11%	6.37
8/20/2013	3	3.00	24.62	11.58	138.5	0.6178	8.65	663	1.33	15%	-0.27
8/20/2013	4	4.00	24.53	10.99	131.0	0.6183	8.62	328	2.33	8%	0.30
8/20/2013	5	5.00	24.43	7.86	99.4	0.6184	8.61	158	3.33	4%	0.22
8/20/2013	6	6.00	23.49	3.66	40.0	0.6223	8.06	98	4.33	2%	0.11
8/20/2013	7	7.00	23.25	2.28	26.3	0.6268	7.50	52	5.33	1%	0.12
8/20/2013	8	8.00	23.01	1.17	13.3	0.6281	7.44	38	6.33	1%	0.05
8/20/2013	9	9.00	22.75	0.37	4.7	0.6335	7.42	26	7.33	1%	0.05
8/20/2013	10	10.00	22.60	0.27	3.1	0.6393	7.46	15	8.33	0%	0.07
8/20/2013	11	11.00	22.43	0.24	2.8	0.6586	7.43	11	9.33	0%	0.03
8/20/2013	12	12.00	22.34	0.23	2.6	0.6645	7.38	7	10.33	0%	0.04

Date MMDDYY	Text Depth feet	Dep25 feet	Temp øC	DO mg/l	DO% Sat	SpCond mS/cm	pH Units	PAR æE/s/mý	Depth of Light Meter feet	% Light Transmission Average	Extinction Coefficient
											0.398
9/17/2013	0	0.00	20.32	5.56	60.2	0.5918	7.98	1914	Surface		
9/17/2013	1	1.00	20.36	5.06	55.3	0.5923	7.96	2126	Surface	100%	
9/17/2013	2	2.00	20.37	5.04	55.2	0.5928	7.96	956	0.33	22%	2.42
9/17/2013	3	3.00	20.34	4.86	53.2	0.5921	7.95	351	1.33	8%	0.75
9/17/2013	4	4.00	20.31	4.82	52.7	0.5919	7.93	181	2.33	4%	0.28
9/17/2013	5	5.00	20.30	4.78	52.3	0.5920	7.94	116	3.33	3%	0.13
9/17/2013	6	6.00	20.30	4.78	52.2	0.5919	7.92	83	4.33	2%	0.08
9/17/2013	7	7.00	20.29	4.76	52.1	0.5921	7.93	56	5.33	1%	0.07
9/17/2013	8	8.00	20.29	4.77	51.6	0.5922	7.91	40	6.33	1%	0.05
9/17/2013	9	9.00	20.28	4.63	50.5	0.5922	7.9	22	7.33	1%	0.08
9/17/2013	10	10.00	20.28	4.57	49.9	0.5928	7.89	13	8.33	0%	0.06
9/17/2013	11	11.00	20.24	4.52	49.2	0.5925	7.87	9	9.33	0%	0.04
9/17/2013	12	12.00	20.19	4.37	49.5	0.5924	7.86	5	10.33	0%	0.06
9/17/2013	13	13.00	20.22	2.57	23.7	0.5971	7.51	3	11.33	0%	0.05

Figure 6. 2013 TP concentrations from points sampled in Lake Barrington compared to Illinois EPA General Use Standard.

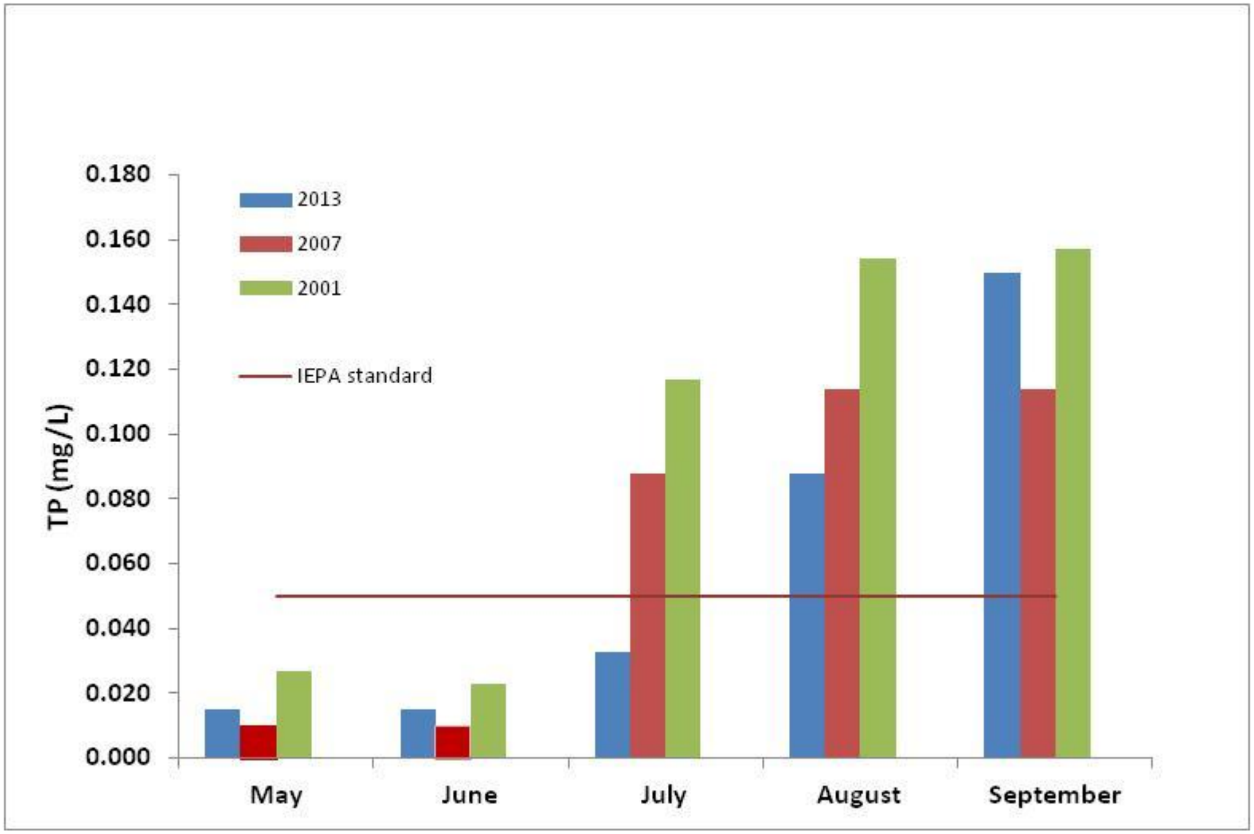


Table 6a. Aquatic plants found at the 98 sampling sites on Lake Barrington in July, 2013.
The maximum depth that plants were found was 11.0 Feet.

Plant Density	Chara	Coontail	Duckweed	Elodea	Flatstemmed Pondweed	Horned Pondweed	Sago Pondweed	Small Pondweed	Southern Najad
Absent	86	67	93	90	95	96	95	97	93
Present	5	12	5	4	2	2	2	0	1
Common	5	11	0	3	1	0	1	1	2
Abundant	0	5	0	0	0	0	0	0	1
Dominant	2	3	0	1	0	0	0	0	1
% Plant Occurrence	12.2	31.6	5.1	8.2	3.1	2.0	3.1	1.0	5.1

Plant Density	Star Duckweed	White Water Lily	Unknown
Absent	91	73	96
Present	5	6	1
Common	2	12	0
Abundant	0	6	1
Dominant	0	1	0
% Plant Occurrence	7.1	25.5	2.0

Table 6b. Distribution of rake density across all sampling sites, Lake Barrington, 2013.

Rake Density (coverage)	# of Sites	% of Sites
No Plants	51	52
>0-10%	14	14
10-40%	16	16
40-60%	9	9
60-90%	4	4
>90%	4	4
Total Sites with Plants	98	100
Total # of Sites	98	

Figure 7. Estimated rake density of vegetation occurring in Lake Barrington, 2013.

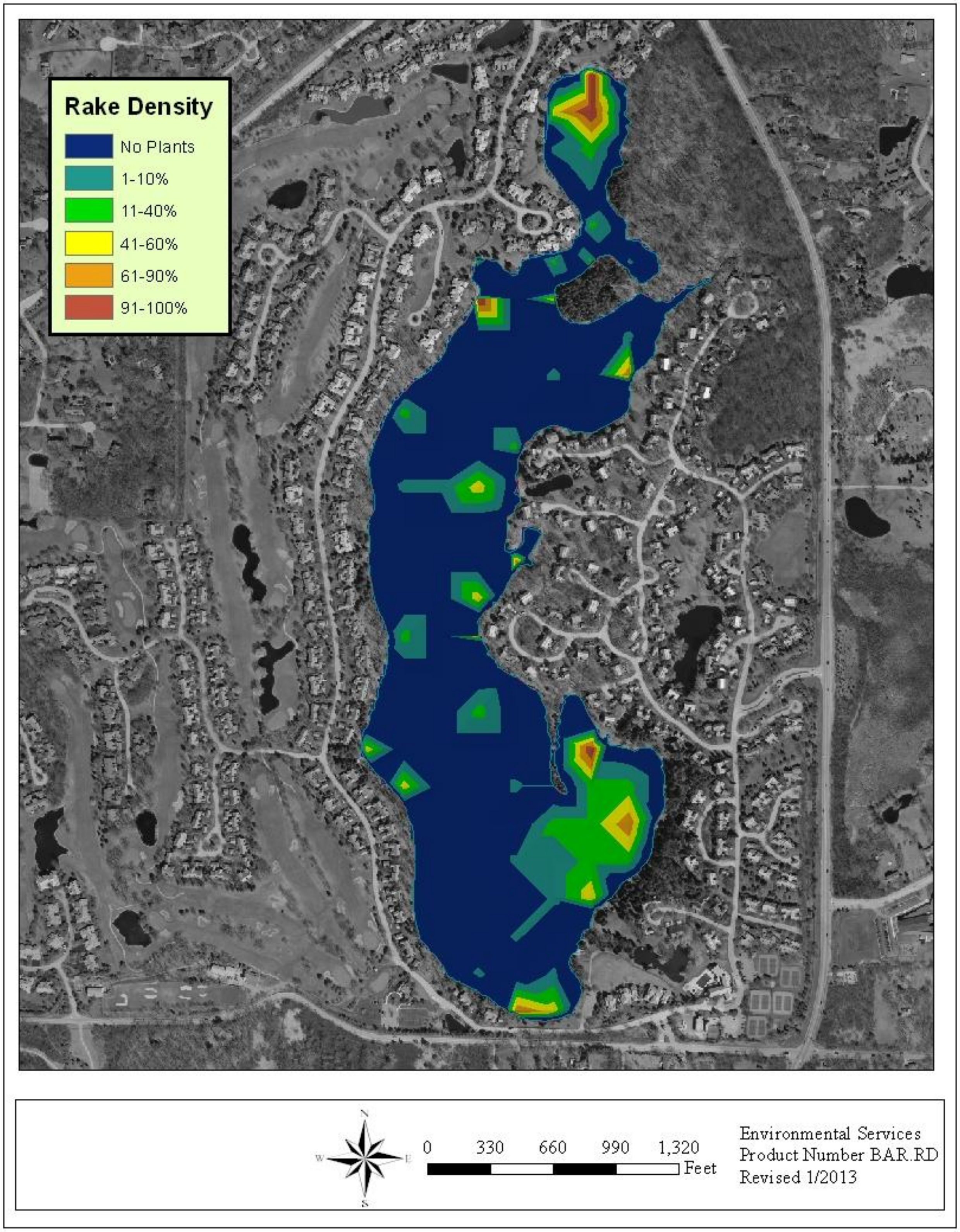


Table 7. Lake County average Floristic Quality Index ranking 2000 – 2013.

RANK	LAKE NAME	FQI (w/A)	FQI (native)
1	Cedar Lake	38.0	36.6
2	East Loon Lake	34.7	36.1
3	Cranberry Lake	29.7	29.7
4	Deep Lake	29.7	31.2
5	Bangs Lake	29.6	26.0
6	Little Silver Lake	29.6	31.6
7	Round Lake Marsh North	29.1	29.9
8	West Loon Lake	27.1	29.5
9	Sullivan Lake	26.9	28.5
10	Third Lake	25.1	22.5
11	Fourth Lake	24.7	27.1
12	Indpendence Grove	24.6	27.5
13	Sterling Lake	24.5	26.9
14	Sun Lake	24.3	26.1
15	Lake Zurich	24.3	27.1
16	Redwing Slough	24.0	25.8
17	Schreiber Lake	23.9	24.8
18	Lakewood Marsh	23.8	24.7
19	Deer Lake	23.5	24.4
20	Round Lake	23.5	25.9
21	Honey Lake	23.3	25.1
22	Lake of the Hollow	23.0	24.8
23	Wooster Lake	22.8	21.1
24	Cross Lake	22.4	24.2
25	Countryside Glen Lake	21.9	22.8
26	Davis Lake	21.4	21.4
27	Butler Lake	21.4	23.1
28	Lake Barrington	21.2	21.2
29	Duck Lake	21.1	22.9
30	Timber Lake (North)	20.9	23.4
31	ADID 203	20.5	20.5
32	Broberg Marsh	20.5	21.4
33	McGreal Lake	20.2	22.1
34	Lake Kathryn	19.6	20.7
35	Fish Lake	19.3	21.2
36	Redhead Lake	19.3	21.2
37	Druce Lake	19.1	21.8
38	Turner Lake	18.6	21.2
39	Salem Lake	18.5	20.2
40	Lake Helen	18.0	18.0
41	Old Oak Lake	18.0	19.1
42	Potomac Lake	17.8	17.8
43	Long Lake	17.7	15.8
44	Hendrick Lake	17.7	17.7
45	Rollins Savannah 2	17.7	17.7
46	Grandwood Park Lake	17.2	19.0
47	Seven Acre Lake	17.0	15.5
48	Lake Miltmore	16.8	18.7
49	McDonald Lake 1	16.7	17.7
50	Highland Lake	16.7	18.9
51	Bresen Lake	16.6	17.8
52	Almond Marsh	16.3	17.3
53	Owens Lake	16.3	17.3
54	Windward Lake	16.3	17.6
55	Grays Lake	16.1	16.1
56	White Lake	16.0	17.0
57	Dog Bone Lake	15.7	15.7
58	Osprey Lake	15.5	17.3

Table 7. Lake County average Floristic Quality Index ranking 2000 – 2013.

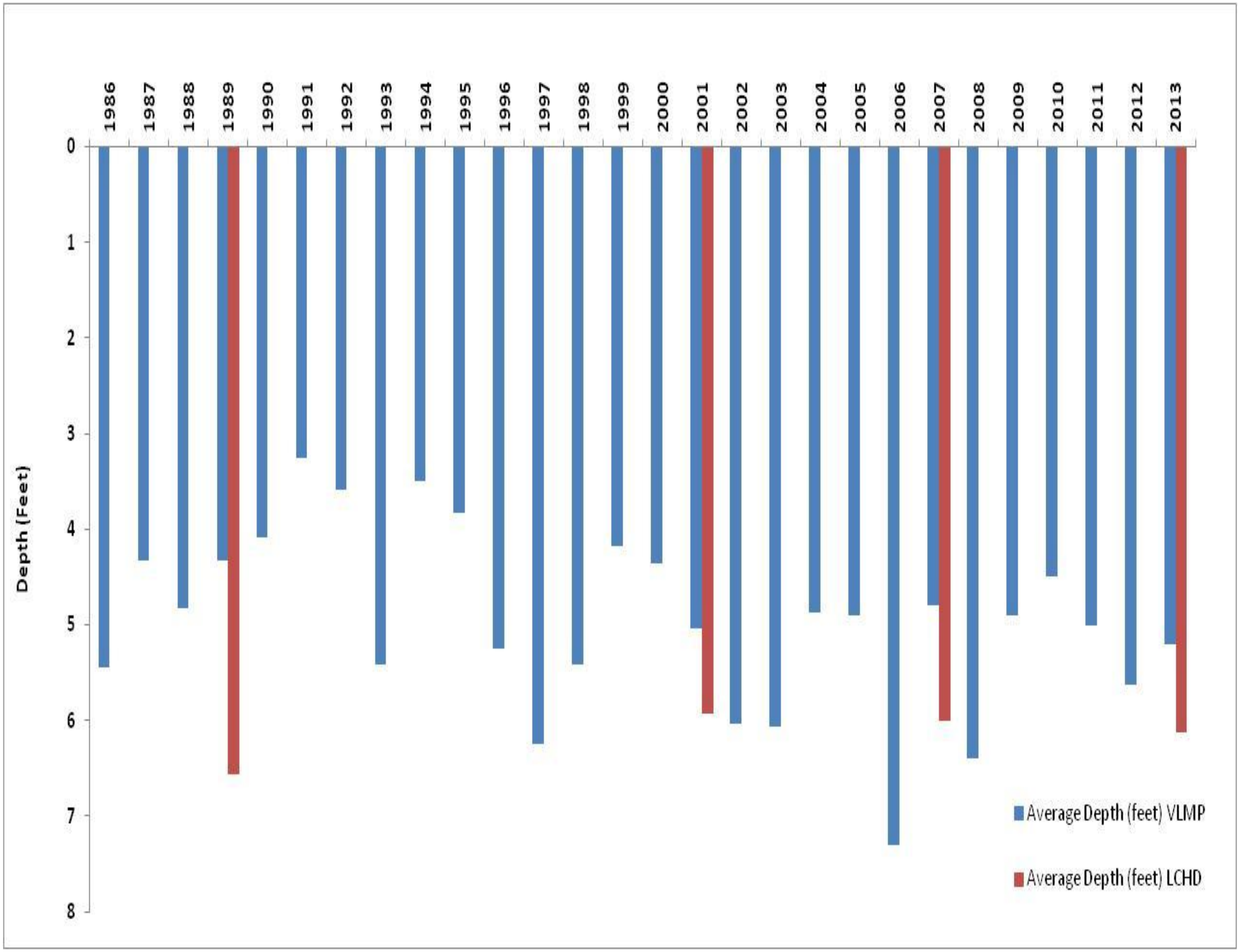
RANK	LAKE NAME	FQI (w/A)	FQI (native)
59	Heron Pond	15.1	15.1
60	North Churchill Lake	15.0	15.0
61	Hastings Lake	15.0	17.0
62	Lake Tranquility (S1)	15.0	17.0
63	Forest Lake	14.8	15.9
64	Dog Training Pond	14.7	15.9
65	Island Lake	14.7	16.6
66	Grand Ave Marsh	14.3	16.3
67	Nippersink Lake	14.3	16.3
68	Taylor Lake	14.3	16.3
69	Manning's Slough	14.1	16.3
70	Tower Lake	14.0	14.0
71	Dugdale Lake	14.0	15.1
72	Eagle Lake (S1)	14.0	15.1
73	Crooked Lake	14.0	16.0
74	Longview Meadow Lake	13.9	13.9
75	Bishop Lake	13.4	15.0
76	Ames Pit	13.4	15.5
77	Mary Lee Lake	13.1	15.1
78	Old School Lake	13.1	15.1
79	Dunn's Lake	12.7	13.9
80	Summerhill Estates Lake	12.7	13.9
81	Buffalo Creek Reservoir 1	12.5	11.4
82	Buffalo Creek Reservoir 2	12.5	11.4
83	McDonald Lake 2	12.5	12.5
84	Rollins Savannah 1	12.5	12.5
85	Stone Quarry Lake	12.5	12.5
86	Kemper Lake 1	12.2	13.4
87	Pond-A-Rudy	12.1	12.1
88	Stockholm Lake	12.1	13.5
89	Lake Carina	12.1	14.3
90	Lake Leo	12.1	14.3
91	Lambs Farm Lake	12.1	14.3
92	Grassy Lake	12.0	12.0
93	Lake Matthews	12.0	12.0
94	Flint Lake Oulet	11.8	13.0
95	Albert Lake	11.5	10.3
96	Rivershire Pond 2	11.5	13.3
97	Antioch Lake	11.3	13.4
98	Hook Lake	11.3	13.4
99	Briarcrest Pond	11.2	12.5
100	Lake Naomi	11.2	12.5
101	Pulaski Pond	11.2	12.5
102	Lake Napa Suwe	11.0	11.0
103	Redwing Marsh	11.0	11.0
104	West Meadow Lake	11.0	11.0
105	Lake Minear	11.0	13.9
106	Nielsen Pond	10.7	12.0
107	Lake Holloway	10.6	10.6
108	Sylvan Lake	10.6	10.6
109	Crooked Lake	10.2	12.5
110	Gages Lake	10.2	12.5
111	College Trail Lake	10.0	10.0
112	Valley Lake	9.9	9.9
113	Werhane Lake	9.8	12.0
114	Loch Lomond	9.4	12.1
115	Columbus Park Lake	9.2	9.2
116	Lake Lakeland Estates	9.2	9.2
117	Waterford Lake	9.2	9.2

Table 7. Lake County average Floristic Quality Index ranking 2000 – 2013.

RANK	LAKE NAME	FQI (w/A)	FQI (native)
118	Lake Fairfield	9.0	10.4
119	Lake Louise	9.0	10.4
120	Fischer Lake	9.0	11.0
121	Lake Fairview	8.5	6.9
122	Timber Lake (South)	8.5	6.9
123	East Meadow Lake	8.5	8.5
124	South Churchill Lake	8.5	8.5
125	Kemper Lake 2	8.5	9.8
126	Lake Christa	8.5	9.8
127	Lake Farmington	8.5	9.8
128	Lucy Lake	8.5	9.8
129	Bittersweet Golf Course #13	8.1	8.1
130	Lake Linden	8.0	8.0
131	Sand Lake	8.0	10.4
132	Countryside Lake	7.7	11.5
133	Fairfield Marsh	7.5	8.7
134	Lake Eleanor	7.5	8.7
135	Banana Pond	7.5	9.2
136	Slocum Lake	7.1	5.8
137	Lucky Lake	7.0	7.0
138	North Tower Lake	7.0	7.0
139	Lake Forest Pond	6.9	8.5
140	Ozaukee Lake	6.7	8.7
141	Leisure Lake	6.4	9.0
142	Peterson Pond	6.0	8.5
143	Little Bear Lake	5.8	7.5
144	Deer Lake Meadow Lake	5.2	6.4
145	ADID 127	5.0	5.0
146	Island Lake	5.0	5.0
147	Liberty Lake	5.0	5.0
148	Oak Hills Lake	5.0	5.0
149	Slough Lake	5.0	5.0
150	International Mining and Chemical Lake	5.0	7.1
151	Diamond Lake	3.7	5.5
152	Lake Charles	3.7	5.5
153	Big Bear Lake	3.5	5.0
154	Sand Pond (IDNR)	3.5	5.0
155	Harvey Lake	3.3	5.0
156	Half Day Pit	2.9	5.0
157	Lochanora Lake	2.5	5.0
158	Echo Lake	0.0	0.0
159	Hidden Lake	0.0	0.0
160	St. Mary's Lake	0.0	0.0
161	Willow Lake	0.0	0.0
162	Woodland Lake	0.0	0.0

Figure 8. Shoreline Erosion Assessed on Lake Barrington, 2013.

Figure 9. Lake Barrington VLMP Secchi Data (1986 – 2013).



Lake Barrington

Lake County